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OF
AFRICA AND EUROPE

BY

LEONARD BROOKS, M.A. (Cantab. and Lond.)

FORMERLY SECOND MASTER AND GEOGRAPHY MASTER AT THE WILLIAM ELLIS SCHOOL

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EDITOR'S INTRODUCTION

THE time has gone by when it was thought possible that a textbook of geography should be equally suitable for pupils at different stages of advancement, so that a series of books suited to different stages is necessary for use in schools. Regions may be studied in different orders suited to different circumstances and aims, and, to be entirely satisfying, each scheme of study should have a special series of books. The series, of which this book forms one, is designed to fit a particular scheme—*i.e.* that in a secondary school in the years at the end of which is one of the First Public Examinations of the type of the London General School Examination, a scheme which has for many years been found in practice to be extremely satisfactory at the William Ellis School.

Three of the volumes cover the world regionally in three years; the fourth contains much of the preceding matter in a condensed form, together with a few additions on subjects which are more profitably studied after other work has been done. Account is taken of the fact that the pupils are advancing in ability, so that, while there is a certain uniformity in that each book provides a north and south section of the world, yet the arrangement is such that the matter increases in difficulty. The series supplies textbooks for a complete school course in geography which includes physical as well as regional geography, and the order in which regions are taken depends to some extent on the desirability of studying particular sections of physical geography in a suitable order.

This third volume of the series deals with Africa and Europe. These continents at once supply an extra-ordinary contrast in the response of man to geographical conditions, and allow of the revision of the work of the two preceding years by comparison and contrast with regions already studied. Europe naturally is taken last, as the relations of man to his environment are much more complicated and difficult to understand in this continent than elsewhere.

JAMES FAIRGRIEVE.

PREFACE

THIS book is the third of a series of four intended to cover the geography course of a Secondary School for the four years leading up to and including the year in which an examination of matriculation standard is taken. Where a five years' course is in operation an introductory course may well follow the lines of Book III of the Junior Regional Geographies (see page iv). The Americas were taken in the first book of the present series, and Asia and Australia in the second, leaving Africa and Europe as the continents for study in the third year. Thus each year's work includes a continent in both northern and southern hemispheres, an arrangement which facilitates the abundant use of comparison and contrast.

The British Isles are rather fully treated, and this is done deliberately in order to lighten the work of the succeeding year. Indeed, one great advantage of the arrangement of the continents adopted in this series is that the pupils have covered the whole field of regional and general geography at the end of the year prior to that in which they would normally sit for a First Public Examination, *i.e.* an examination of matriculation standard. In that year they have, therefore, abundant time to make a final revision for examination purposes without recourse to cramming.

Book III of Mr. V. C. Spary's New Regional Map Books (University of London Press, Ltd.) provides an excellent set of map exercises for use with this book.

As the author is a Divisional Inspector of Schools under the London County Council, it is necessary for him to state that the Council is in no way responsible for any of the opinions which are expressed in the book.

L. BROOKS.

Hampstead Garden Suburb,
*London, N.W.*4.
November 1924.

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AFRICA

CHAPTER I.

GENERAL AND PHYSICAL CONDITIONS.

THE RELIEF OF AFRICA.

AFRICA, whose area has been estimated at eleven and a half million square miles, is the second largest of the continents. An enormous peninsula, united to Asia by the narrow isthmus of Suez, it stretches through almost the same amount of latitude on each side of the equator, although it is obvious, owing to its shape, that the major portion of the continent lies in the northern hemisphere.

The great fact to grasp about the relief of Africa is, that it is almost entirely an enormous plateau, composed of great sheets of ancient rocks which lie practically undisturbed in horizontal layers. Only in the extreme north-west and south-west are there areas which structurally do not belong to the plateau. This enormous plateau is probably a fragment of a much older continent, which stretched across the southern hemisphere and included the ancient plateaus shown on Fig. 1. Extensive fracturing and subsidences formed the oceans which now separate these plateau masses from each other. A physical map of Africa will show that so narrow are the continental shelves round its coasts, and so near the coast are waters deeper than 1,000 fathoms reached, that even if the continent were uplifted a mile, the alteration to its present shape would be comparatively insignificant. It would require an even greater elevation to attach Madagascar, also a fragment of the ancient continent just mentioned, to the mainland.

But the African plateau is not of uniform elevation, as an examination of a physical map will show. It is much higher in the south and east than in the north, where the continent reaches its greatest breadth. In a broad belt stretching in a N.E.–S.W. direction from the southern Red Sea to the south-western coast, the plateau reaches a minimum elevation of between three and four thousand feet. This high belt is crossed in its northern portion by the Great Rift Valley, of which we learned in Book II (see Fig. 2 and pp. 59, 86). On the margins of this mammoth rift valley are such great volcanic piles as Kilimanjaro, Kenya and Elgon. In the south-west of the plateau we find remnants of ancient folded mountains, which, after having been worn down to peneplains, have been uplifted once more, thus resulting

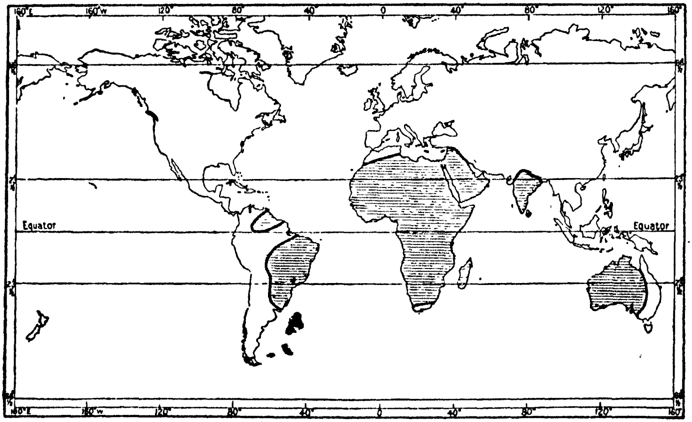


FIG. 1.—The great southern plateaus of unfolded strata. All were formerly part of an ancient continent which geologists call Gondwanaland.

in the carving out of new series of valleys and ridges. The Atlas region, to the north-west of the plateau, comprises newer folds and belongs to the Alpine ranges which nearly encircle the western basin of the Mediterranean.

It follows from this account of the simplicity of the structure of Africa that the continent will be remarkable for its compactness and the regularity of outline. Although it is three times as large as Europe, the African coastline measures less than that of Europe, being in fact only equal to the combined coastline of the British Isles and Norway. The absence of long peninsulas and arms of the sea penetrating far inland as in Europe, has had a great deal to do with the difficulty of access to the interior lands which, until comparatively recent times, caused Africa to be known as the Dark Continent. Nor can the interior be easily approached by means of the natural gateways, the rivers, for the plateau character of the continent causes the rivers to have falls in their courses at the points at which they leave the plateau for the plains (*e.g.* the Livingstone Falls of the Congo), and thus their navigation is impeded. This is another reason for the comparatively recent exploration of the interior lands of the continent.

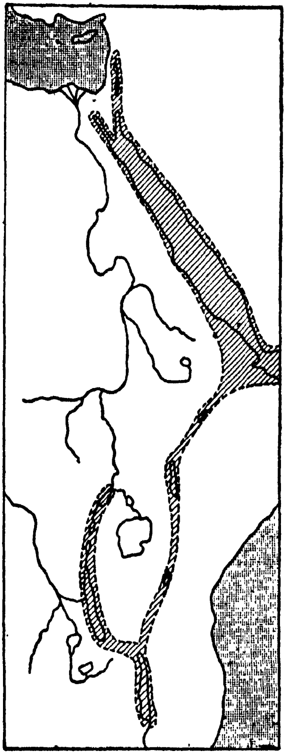


FIG. 2.—The Great Rift Valley.

CLIMATE.

In studying the climate of Africa, the most important set of factors for us to master are those associated with the seasonal migrations of heat, pressure and rain belts. Most of the continent lies within the Tropics, and even the extra-tropical parts are in warm temperate latitudes. From this we shall expect to find that a great part of Africa will have a high mean annual temperature, but we must not forget that in most parts altitude will reduce temperature, especially in the east and south, although only in the high Atlas and south-western areas does the temperature fall so low as to be suitably described by the word "cool."

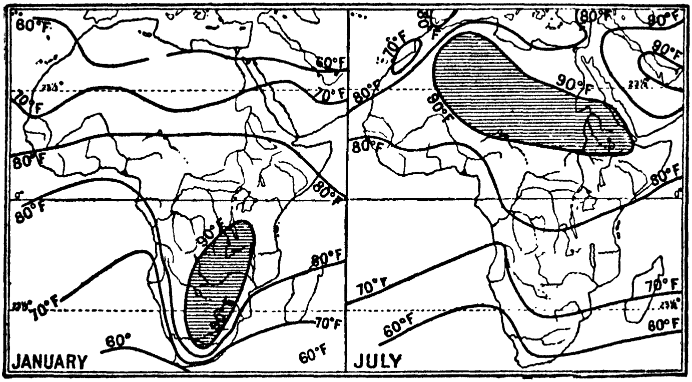


FIG. 3.—January and July sea-level isotherms.

Fig. 3 gives the January and July sea-level isotherms. It shows that the hottest region in January is south of the equator, and in July north of the equator. These areas north and south of the equatorial belt have higher temperatures at their summer seasons than are ever experienced in the equatorial belt. They also have a distinct seasonal range of temperature, whilst the difference between night and day temperatures is also very well marked. The equatorial belt is remarkable for its equable temperature, there being little difference between night and day, and winter and summer temperatures. Indeed, the words "summer" and "winter" convey little meaning when applied to an equatorial belt. In Africa, only in the north-west and south do we get anything approaching seasons well defined by temperature differences. In most parts the seasons are best marked by the period at which most rain falls. Fig. 4 gives the

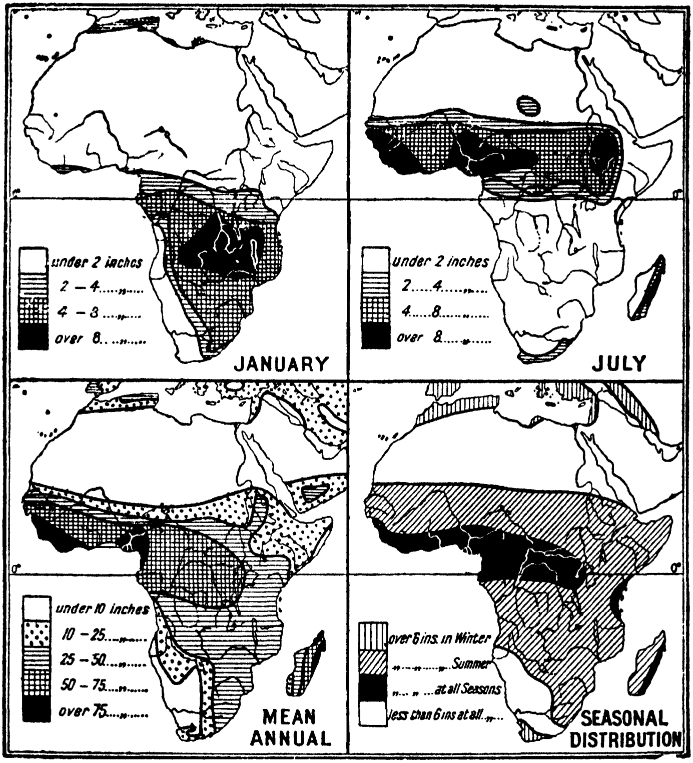


FIG. 4.—Rainfall maps.

mean annual rainfall of Africa. It shows that from the equatorial belt of heavy rainfall (50″–75″), the amount of rainfall diminishes until the almost rainless Sahara and Kalahari regions are reached. Then we come to the north-west and south-west areas, where rain falls. Fig. 4 also gives the rainfall for January and July. In January, when the sun is overhead in the southern hemisphere, the area of heaviest rainfall, as well as of highest temperature and lowest pressure, is also south of the equator, whilst in July the conditions are reversed. Indeed, as is clearly shown by Fig. 5, there is a very close connection between the apparent migrations of the Sun, the " heat equator " and the low-pressure belt on the one hand and the rain on the other. Considering together Figs. 4 and 5 it is evident that the belt near the equator has a heavy rainfall with no distinctly dry season, although the wettest seasons are near the equinoxes, when the low-pressure doldrums belt is nearest the equator. The heavy rainfall of the equatorial belt, as we learned in Book II, is due to the forced rising of the air of the trade winds, which meet in the doldrums belt of low-pressure calms. The migration of this belt, and of all the pressure belts, gives, north and south of the equatorial belt of rain at all seasons, two belts where the rain falls only in summer (see Fig. 4). These are succeeded by dry belts, which experience the trade winds at all seasons, for they are unaffected by the migration of the pressure belts. In the north-west and south-west, as will be seen from the rainfall maps, the migrations of the pressure belts give low pressure in winter and high pressure in summer, thus giving the winter rain and summer drought which are typical of the *Mediterranean Type of Climate.* Fig. 6 will make clear these connections between the migration of the pressure belts and the seasonal distribution of rain. But we must notice that it applies only to western margins, because a wind which is an on-shore or sea-wind on the east will be an off-shore or land-wind on the west. For example, the south-east trade-winds

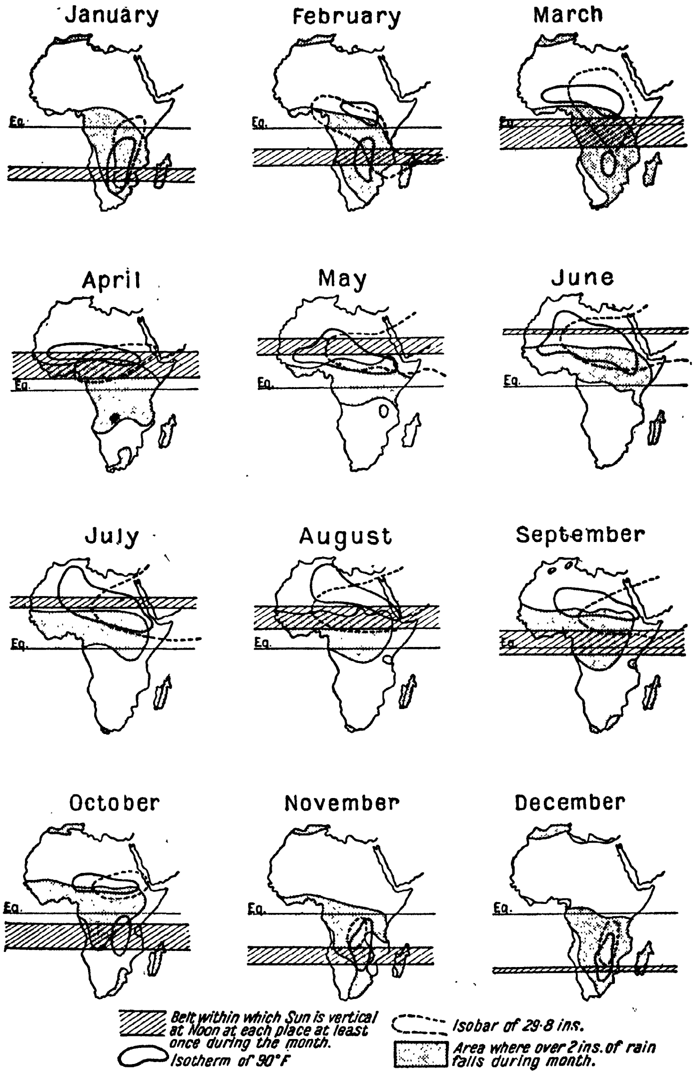

January
February
March
April
May
June
July
August
September
October
November
December
Eq.
Belt within which Sun is vertical at Noon at each place at least once during the month.
Isotherm of 90°F
Isobar of 29·8 ins.
Area where over 2 ins. of rain falls during month.

FIG. 5.—The connections between the apparent migration of the sun, and the distribution of temperature, pressure and rainfall.

must bring rainfall to south-east Africa; but, partly

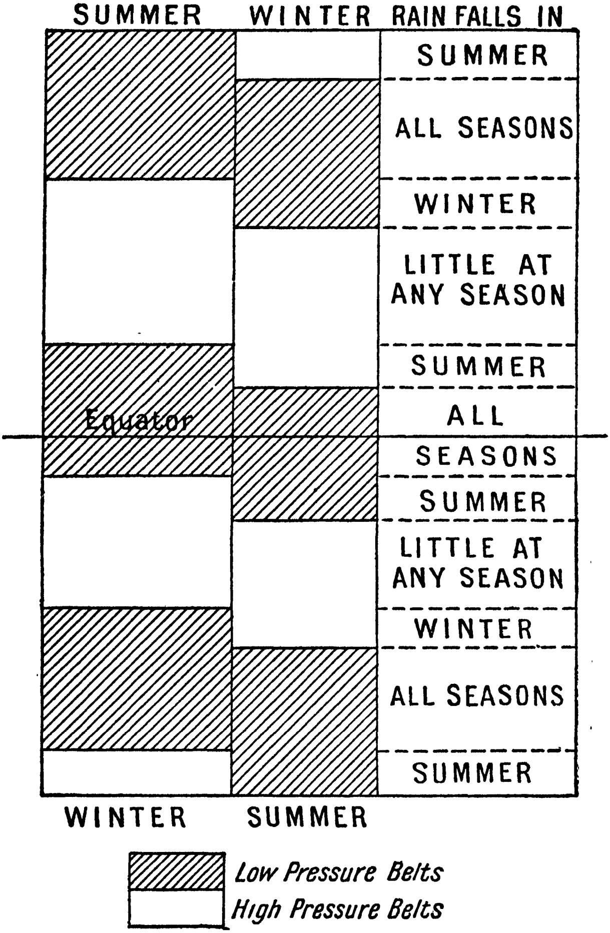


FIG. 6.—The influence of the migration of the pressure belts on the distribution of rain on the western margins of continents.

due to the loss of some of that moisture when the wind is forced to ascend the steep plateau edges, and partly due to the fact that the plateau character of the continent causes no further forcing upwards, the west coast regions in the same latitude are deserts (Kalahari). In the case of the corresponding dry Sahara belt north of the equator, the winds do not cross any large masses of water in their progress from the horse latitudes to the equatorial low-pressure belt, so that the desert stretches across the continent from east to west.

VEGETATION AND ANIMALS.

Vegetation.—The effect of the climatic conditions is clearly seen in the distribution of natural vegetation, the vegetation zones closely corresponding to the climatic zones (Fig. 7). The Guinea Coast and Congo basin belt of constant heat and moisture is marked by equatorial forests, in which are found innumerable species of trees, including great giants, and an undergrowth of vegetation, itself of forest dimensions, the whole being interlaced by parasites and creepers. The most important commercial products of these forests are the oil palm and rubber, but hard-woods, such as mahogany, are found, especially in the wetter parts of the region. There are also areas of tropical forest along the narrow east-coast plains and on the coastal plains of Madagascar.

Outside the equatorial belt, the growth of vegetation in Africa is largely influenced by the presence of a distinctly dry season. To the north, south and east of the tropical forests there are the vast areas known as savannahs, tropical grasslands interrupted by clumps of trees, and often called park-lands on account of their picturesque appearance. These tropical grasslands have rain in summer, and as this is not sufficient in amount for the growth of forests, the prevailing vegetation is grass, although even grass must give way to thorny scrub where the soil is infertile. Where there is sufficient moisture, as in the wetter river valleys, extensive woodlands are often met with, but trees are usually encountered in clumps. The commonest tree is the *baobab,* which in appearance somewhat resembles a very old oak. It grows to an enormous size and has soft spongy wood, which acts as a reservoir for the storage of water needed during the dry season. Transpiration at this season is also checked by the shedding of the leaves. Another common tree is the *euphorbia.*

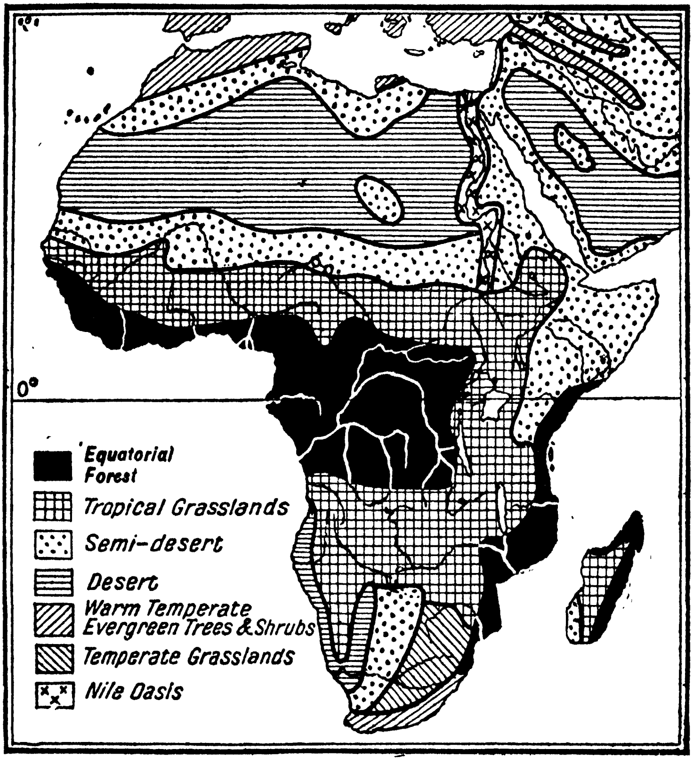


FIG. 7.—Distribution of natural vegetation.

Northwards and southwards the savannahs pass very gradually through an intervening scrubland into desert, the Sahara in the north, the Kalahari in the south. In the scrublands the dry conditions compel the sparse vegetation to adopt means of obtaining or conserving moisture. Thorny scrub, wiry grass, dwarf acacia, cactus and aloe are all to be found. Some of these have dry and thorny leaves, whilst all strike their roots deep into the soil. In some parts, especially in Somaliland, gums and aromatic shrubs, such as myrrh and frankincense, are of economic importance. In the true desert, where dry conditions are found at all seasons, vegetation is reduced to a minimum, except where underground water reaches the surface in oases and causes "the desert to blossom as a rose." In such places the typical tree is the date palm. Elsewhere there are only small, dried-up plants, existing either upon the small amount of nightly dew, or upon the occasional thunderstorms, whilst large tracts are quite devoid of any vegetation.

North of the Sahara and south of the Kalahari, deserts merge very gradually into scrublands, and these in turn change to the "Mediterranean" vegetation of the Atlas region and the Barka peninsula in the north and of the south-west corner in the south. In these areas the dry season is summer, so that the plants must adapt themselves to withstand drought at the hot season. They do this in many ways. Some, like the olive, have small dry leaves; some, like the cork oak, have thick bark; others, like the laurel, have thick, glossy leaves, whilst others, like bulbous plants, store food in their fleshy roots. In the Atlas region, the wetter slopes of the mountains are forested, whilst the dry plateau is almost treeless. In the south-west, forests are common, and the eucalyptus has been introduced with success from the similar climatic region of south-west Australia. Both in the Atlas region and in the south-west corner of the continent all the Mediterranean fruits and cereals are cultivated with much success.

Animals.—Just as the vegetation zones closely correspond to the climatic zones, so the animals of Africa are closely related to the vegetation zones. In the equatorial forests large animals are crowded out by the trees, yet we do find tree-dwelling animals, such as monkeys, gorillas, apes and chimpanzees, as well as snakes, which glide along branches or through dense undergrowth. The savannahs are exceedingly rich in animals belonging to grassy plains, and abound in big game. The elephant, giraffe, zebra, antelope, gazelle, rhinoceros and the hippopotamus are all to be met with. The rhinoceros and hippopotamus make their homes along river or lake swamps; the giraffe, zebra, gazelle and antelope are grazing animals, all endowed with a swiftness of movement which is very necessary, since they are followed by beasts of prey such as the lion, leopard and hyena. Most savannah animals can exist for a considerable time without water, but drink very deeply when they get the opportunity. Of grassland birds, the quick-running but wingless ostrich is the most important. The rivers are usually infested by crocodiles. On the desert margins the chief animals are goats and camels. The camel is well named the "ship of the desert," for, since it can live without food and water for several days, it is the only animal capable of crossing those cheerless tracts.

Insects abound in Africa. Some of them, like the tse-tse fly, are very dangerous to human beings and animals. The tse-tse fly is the means whereby the blood parasites which cause the dreaded sleeping sickness are carried. It also carries diseases to animals, so that, owing to its ravages, transport in tropical African lowlands is largely conducted by means of human carriers. The termite, or white ant, is also very common, and performs the useful function of scavenger, for it eats all decaying or dead vegetable matter. Indeed, it can eat everything except stone, metals and the very hardest of woods. On this account only very hard wood can be used for the construction of railways, etc. As in

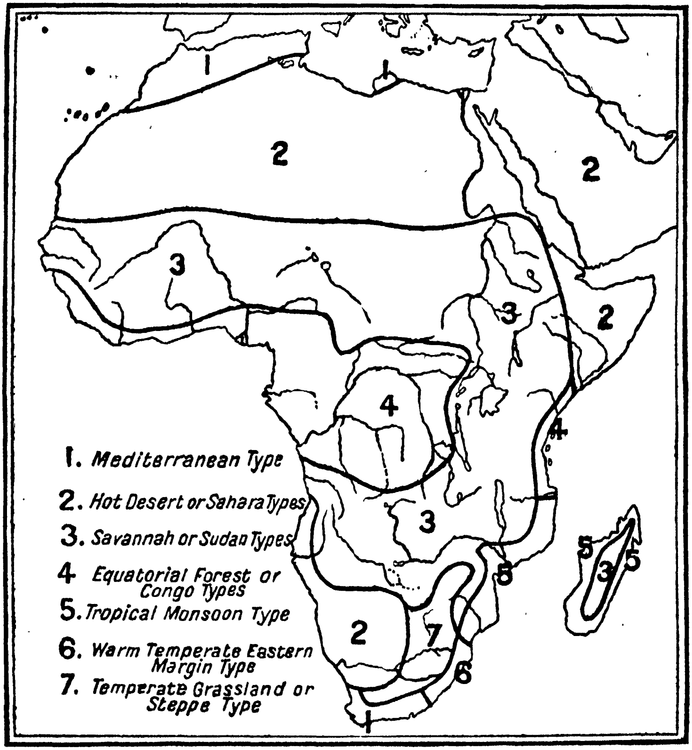
Argentina, the locust also does much damage to crops in the drier parts of North and South Africa.

NATURAL REGIONS.

Africa may be divided into several large divisions or natural regions. If we could divide the continent into regions that were at once physical, climatic, vegetation and occupational units—that is, regions of the same physical type throughout, in which the same set of climatic conditions were experienced throughout each unit, and produced the same set of results, as seen in the natural vegetation and chief occupations—we should have ideal regions. To carry this out thoroughly we should have to divide the continent into more regions than would be suitable for our present purpose, for which it is sufficient if we take a few large or major natural regions, in each of which the leading geographical features are so outstanding as to allow of the whole region being considered as a unit. In selecting such regions the best guide is that of natural vegetation, for if a region has the same type of vegetation over the greater part of its area, it follows that the physical factors of relief and climate, which influence natural vegetation, are also approximately uniform, whilst a dominating type of vegetation will give the same leading natural occupations throughout the area. There is no region in Africa whose leading characteristics are quite new to us, for we have described very similar areas in other continents. We are thus in a position to compare each African unit with other parts of the world. Let us begin with the equatorial region, which may be compared with the Amazon basin in South America and the East Indies in Asia. As Fig. 8 shows, it includes the Guinea Coast, the Congo basin, and an East Coast margin. We may call this the *Congo Type* of natural region. Its distinctive characteristics (see first set of figures below) are heat and moisture at all seasons, resulting in a prevalent vegetation of equatorial forest, and giving very backward human conditions.

Place.	Lat.	Approx. Elevation in Feet.	Coolest Month.	Warmest Month.	Mean Annual Rainfall in ins.	Notes on Seasonal Distribution of Rainfall.
Lagos	6° N.	25	77° F. (Jan.)	79° F. (July)	70	All seasons, especially summer.
Equatorville	0°	1050	76 (July)	78 (Mar.)	68	All seasons, especially near equinoxes.
Leopoldville	4° S.	1100	76 (July)	80 (Sept.)	55	Least in winter.
Mombasa	4° S.	60	78 (July)	82 (Jan.)	47	All seasons.
Timbuktu	16° N.	820	70° F. (Dec.)	94° F. (June)	9	Mainly in summer.
Khartoum	15° N.	1259	70 (Jan.)	92 (June)	15	,, ,,
Tabora	5° S.	4000	70 (June)	72 (Jan.)	30	,, ,,
Aswan	24° N.	360	60° F. (Jan.)	93° F. (July)	0	Little at any season.
Cairo	30° N.	100	54 (Jan.)	86 (July)	1.5	,, ,,
Walfish Bay	22° S.	10	54 (Aug.)	65 (July)	0.3	,, ,,
Algiers	36° N.	75	54° F. (Jan.)	77° F. (July)	27	Mainly in winter.
Cape Town	34° S.	38	54 (July)	70 (Jan.)	25	,, ,,
Mozambique	15° S.	S.L.	74° F. (July)	83° F. (Jan.)	40	Most rain in summer.
Beira	20° S.	S.L.	69 (July)	81 (Jan.)	60	,, ,,
Durban	30° S.	250	64° F. (Aug.)	77° F. (Jan.)	42	Heaviest in summer.
Pietermaritzburg	29° S.	2100	55 (July)	72 (Jan.)	33	,, ,,
Johannesburg	26° S.	6300	47° F. (July)	68° F. (Jan.)	31	Mainly in summer.
Kimberley	29° S.	4050	50 (July)	76 (Jan.)	18	,, ,,
Salisbury	17° S.	4800	56 (July)	70 (Jan.)	34	,, ,,

The second set of figures illustrates the climatic conditions of the *Sudan Type* of region. Except in the equatorial belt of the Great Lakes Plateau (see statistics for Tabora) there is a distinct range of temperature, the summers, owing to the clearer atmosphere and the absence of a forest screen of vegetation, being hotter than in the equatorial regions, and the winters somewhat cooler, although they may be described as from very warm to hot. The rainfall, which occurs chiefly in summer, is insufficient for forest growth, so that the


1
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1. Mediterranean Type
2. Hot Desert or Sahara Types
3. Savannah or Sudan Types
4 Equatorial Forest or Congo Types
5. Tropical Monsoon Type
6. Warm Temperate Eastern Margin Type
7. Temperate Grassland or Steppe Type

FIG. 8.—The major natural regions of Africa.

natural covering is grass. This region is the land of the savannahs, the equatorial grasslands, the largest natural unit in Africa. These grasslands, and the animals they support, have made it possible for there to be a large native population, a fact in striking contrast to similar regions in South America (Brazilian and Guiana highlands), where the native population has always been very small, partly due to the lack of animals, and partly to the infertility of much of the soil.

The third set of figures is typical of the *Sahara Type* of natural region. The range of temperature exceeds that of the Sudan, but even more striking is the large diurnal range. The heat gained by the exposed surface of the desert during the day is soon lost, and the nights are usually very cold. Owing to the lack of rainfall there is little vegetation except in the oases. Notice the position of these African deserts. They are on the west of the continent in trade-wind latitudes. Now, compare the very similar positions of the great deserts of other continents.

Algiers and Cape Town give us typical conditions in the *Mediterranean Type,* which we have already encountered in California and Central Chile, in parts of the Land of the Five Seas in Asia, and in south-west and south-east Australia and the North Island of New Zealand in Australasia. An examination of the map of the world will show the positions of these areas to be on the western margins of continents, to the north (to the south in the southern hemisphere) of the great, hot deserts. The summer is very warm and droughty, and the winter mild and wet, the distinctly seasonal character of the rainfall being due to the migration of the pressure belts and therefore of the rain belts. As we have already seen, the vegetation is of the evergreen variety represented by cork oaks, walnuts and chestnuts, and by such fruits as olives, mulberries and vines.

The fifth natural region is found on the east coastal belt south of the equatorial belt. It includes the unhealthy coastal plains and the lower valleys of the Zambezi and Limpopo. It has a hot *Monsoon Type of Climate* and may be compared with the coastal belt of north Australia and with the wet coastal lands of south-eastern Asia. The temperature conditions somewhat resemble those of the Sudan type, but the rainfall, although confined to the summer, is heavy enough for the growth of tropical forests.

Still further south, along the eastern coast, there is a unit of the *Warm Temperate Eastern Margin Type,* in which the climatic conditions closely resemble those of the eastern margins of North and South America, Asia and Australia in similar latitudes. The greater distance from the equator gives cooler temperature than in the last region, but the rainfall, although heaviest in summer, is not entirely confined to that season, for rain falls at all seasons with least in winter. The region rises by well-marked terraces to the high plateau, so that the natural vegetation and the cultivated products vary from the tropical crops (cotton, sugar, tea, etc.) of the coastal plains, to the grasslands and temperate cereals of higher levels.

The seventh region may be called the *Warm Temperate Interior Highland Type,* and is to be found on the plateau, acting as a transition between the wet, eastern coastal belt and the Kalahari desert of the western margin. As the last set of figures show, the temperature conditions are those of a temperate type of climate. The rainfall, which diminishes from east to west, occurs mainly in the summer, and is not sufficient for the growth of forests. Therefore the prevailing vegetation is that of a temperate grassland or steppe. Where the rainfall is sufficient, or where means of irrigation are possible, agriculture can be carried on, but much of the land is devoted to pastoral occupations. Towards the west, the steppe merges very gradually into the desert and semi-desert wastes of the Kalahari. The discovery of valuable mineral deposits, especially of gold and diamonds, has been the means of introducing a large mining population to this region.

EXERCISES.

1. What are the most striking features of the relief of Africa? How far do they influence other factors in the geography of the continent?

2. Draw sections across Africa: (*a*) From Durban to Walfisch Bay; (*b*) along latitude 20° S. (including Madagascar); (*c*) along latitude 20° N. Add explanatory notes.

3. "Forest, grassland and desert are all found in Africa." Draw a sketch map to show the distribution of these three types of natural vegetation. Account for their distribution as well as for the differences in the particular kind of forest, grassland or desert found in different regions.

4. Write a detailed account of the facts which emerge by bringing together on one map the climatic factors shown on Fig. 5. What evidence of "the lagging of the seasons" can you find?

5. If your atlas contains maps showing actual isotherms, compare them with Fig. 3, and point out the chief differences.

6. Which parts of Africa may be termed "regions of difficulty," "regions of debilitation," "regions of privation," "regions of wandering," "regions of increment"? In each case discuss the suitability of the titles for the regions you select.

7. Africa contains areas which have rain (*a*) in winter only, (*b*) in summer only, (*c*) at all seasons. Mention some of these, and give the reasons for the particular rainfall distribution as fully as you can.

8. What is a natural region? Illustrate your answer by reference to examples from Africa.

CHAPTER II.

THE RACES OF AFRICA.

The native races at present living in Africa belong to two great groups, the Black and the White, between whom the broad Sahara desert, the real separator of everything which is essentially European from that which is essentially Africa, has for ages been a great barrier, excepting in the east, where movement along the Nile valley is comparatively easy. Various implements of great antiquity have been found from Somaliland to the Atlantic, in the Congo basin and as far south as the Cape of Good Hope. These were fashioned by palæolithic man, of whom we have no records and who probably left no survivors. It is believed that all the present main races of Africa entered that continent from southern Asia, almost entirely by one or the other of two great highways of race migration. Some entered by way of the Suez Isthmus, others passed into Africa from the south-western extremity of Arabia. In this connection it should be noted that until geologically recent times Africa was connected with Europe by means of several land bridges, whilst the Red Sea was once an inland lake, so that, as at present to the north of that sea, there was once a continuous land passage to the south. Now if most of the ancestors of the present African natives came from Asia, there must have been race migration on a great scale within the continent itself, and it is interesting to notice how these were influenced by geographical conditions, which, of course, may have changed somewhat during the ages. Movements of peoples, like those of liquids, take the lines of least resistance. Thus the presence of vast expanses of open grassland stretching continuously from the Sahara to the Drakensbergs, and from the Red Sea to the Atlantic, have been the means of enabling races to migrate enormous distances with comparative

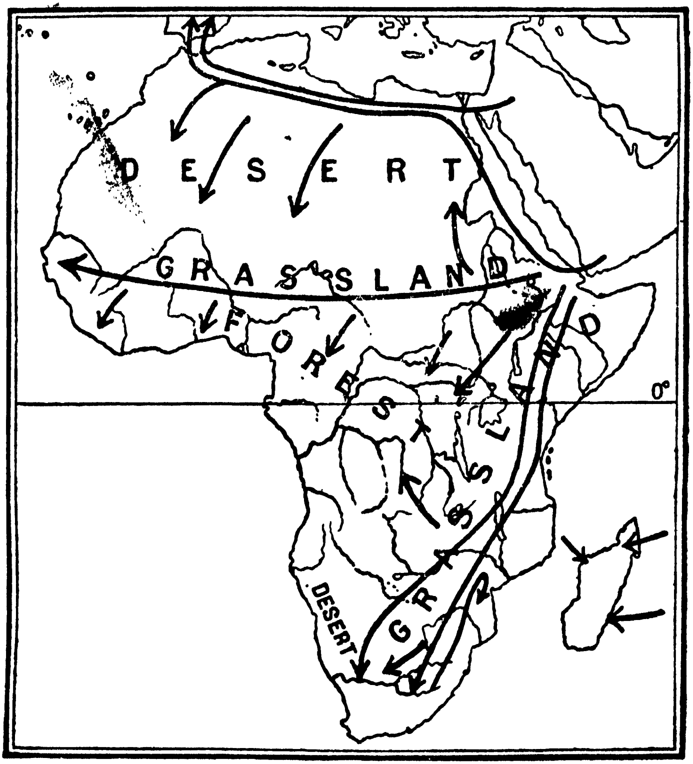

FIG. 9.—The highways of migration from Asia to Africa.

ease. On the other hand, the Congo forests and the Sahara desert have impeded migration. The forests have been the retreat in which weaker races from the surrounding grasslands have taken refuge when hard pressed by stronger invaders, whilst the Sahara has effectively prevented the white and black elements in the population from mixing to anything like the extent which would otherwise have occurred. Thus, broadly stated, the great African race migrations have followed the following routes: (i) From the Sinai peninsula, along the north of the Sahara to the Atlas region; and (ii) from south-west Arabia, (*a*) along the Nile and then north of the desert, (*b*) westwards along the grasslands lying between the desert and the forest, (*c*) southwards along the grasslands as far as the Cape.

North of the Sahara the white Semitic and Hamitic races are to be found. Both were formerly wandering pastoral peoples, who gradually extended their power westwards over the whole of Africa north of the Sahara, and even, by means of the establishment of caravan routes linking the oases, over the desert. Their expansion over the Sudan grassland south of the desert was not easy, owing to the large negro population already in possession of those regions. The Hamites appear to have entered the continent from south-west Arabia, and to have passed via the Nile valley to North Africa. The northern Semites appear to have entered via the Isthmus of Suez route. In Egypt the Hamitic element predominates. In the Atlas region the pastoral nomadic Arabs are of Semitic origin, the agricultural Berbers are Hamites, whilst the Moors, who inhabit the towns, are of mixed descent. The Tuaregs, wandering and frequently robber-like tribes, dwell on the Sahara, south of Algeria. They, like the Somalis, are Hamitic, and are Berbers who have been driven southwards by Arab invaders. The Hamites can be distinguished from the Semites by their darker skins, coarser features and the frequent occurrence of frizzy hair, traits due to some mixing of Hamitic and negro blood. The Abyssinians appear to have been influenced by Arab (Semitic) influxes from south-western Arabia. The Nubians, who inhabit the west bank of the Middle Nile, and the Masai tribes of the Great Lakes plateau, are of mixed Hamitic and negro blood. The migrations of the Masai, who were an aggressive pastoral tribe with a military organization almost equal to that of the Zulus, appear to have been stopped by the coming of Europeans. In the Sudan there is also much mixed white and negro blood, although the bulk of the people there and on the Guinea coast are of pure negro stock. The Hausas of the northern Nigerian area are the most advanced, their language being the one used in most of the commerce of West Africa. Along the Guinea coast dwell many tribes (*e.g.* Krus, Ashanti, Yorubas, etc.) who moved seawards from the Sudan either voluntarily or by the pressure of more powerful tribes. The Niger delta harbours remnants of many ejected people. The question of salt supply, however, is often of importance in accounting for the coastward movements of vegetarians.

In Africa south of the equator the Bantu negro predominates. This group comprises many tribes who differ from each other in some respects, but who, on the whole, have so much in common that they may be grouped together. They speak many dialects of the same language, one of them, Swahili, being the commercial language used in East Africa. Bantus are not of pure blood, being a mixture of negroes with Hamites or other races. They differ from the true negro of the Sudan in being shorter, and in the possession of a lighter skin. Undoubtedly, the finest type of the Bantu is the Zulu, who inhabits the territory to the east of the Drakensberg Mountains. A Zulu Bantu branch, the Matabili, about the year 1817 crossed the Drakensbergs and migrated northwards. Being repulsed by the Boers, they retired to the Zambezi valley, from which they were driven by the tse-tse fly. Then they conquered and occupied the southern part of the territory of the less virile Mashonas, whom they drove to the north-east. In South Africa the name Kaffir is loosely applied to the Zulus and Matabili, and often to other South African Bantus.

The Bushmen and Hottentots of South Africa are very interesting as being the probable remnant of the earliest inhabitants of whom representatives still remain. Both appear to be dying out, for the lands in which they are now to be found, and to which they have been forced to retreat by the stronger Bantu races, are incapable of supporting large numbers. The Bushmen are found along the lower Orange River and in the Kalahari desert. They are very small in stature—averaging only about five feet—their skin is yellowish in colour, and their hair grows in isolated tufts. The Hottentots, who are rather taller, but more virile than the Bushmen, have physical characteristics which would suggest mixed Bushmen and Bantu blood. They are found in the same regions as the Bushmen, but they usually occupy better land.

In the Congo forests are Pygmies, small tribes whose average height does not reach four and a half feet. Their dark yellowish skin and other features make it appear very probable that they are related to the Bushmen, and, like them, are the descendants of the aboriginal peoples. They too have been driven into the forests by the pressure of stronger races.

In Madagascar, the western peoples are of Bantu stock, but the plateau and east coast are chiefly peopled by races of Malay origin, the predominant race being the Hovas, who inhabit the plateau. The Malagasy of the east coast are of mixed Bantu and Hova blood. Between the East Indies and Madagascar is the broad Indian Ocean, which must have been crossed by seafaring colonists from the former islands.

EXERCISES.

1. To what extent may the Sahara and not the Mediterranean Sea be described as the real southern boundary of Europe?
2. In what sense may the Congo forests be described as "Treasure Houses of the Past," or as "Refuges of Lost Causes"?
3. Account for the present distribution of Pygmies, Hottentots and Bushmen.
4. Give some account of any large-scale African race migration. Show how it was related to geographical conditions. What conditions lead to racial migrations on a large scale?

CHAPTER III.

THE UNVEILING OF THE DARK CONTINENT.

UNTIL seventy years ago Africa was known as the "Dark Continent." But this picturesque name was only true of the interior, for the whole of the coastal margins were known at that time, and many settlements had been effected thereon, whilst the coasts of the Atlas region, Egypt and the lower basin of the Nile, and the coastal margins of north-east Africa, had been known from the very dawn of history. Throughout the story of the unveiling of the Dark Continent, only the outlines of which can be told here, we see the control of geographical conditions. The Săhara not only prevented the ancient dwellers along the North African coastlands from meeting the negroes of the Sudan, but later hampered the Portuguese in their slow, coastal methods of discovery along the north-west coast. Therefore the discovery of western Africa was a very slow process until Columbus taught sailors that there was nothing to fear in sailing far out on the unknown ocean, whilst by his time the compass had become a reliable navigating instrument. Even when the coasts had been discovered, the configuration of the continent made the approach to the interior by means of the rivers of little value owing to the presence of waterfalls or rapids, whilst the great heat of the equatorial coastlands, the presence of dangerous fevers and the ravages of the tsetse fly, made further progress very difficult, and also killed the beasts of burden. All these factors co-operated in keeping Africa the Dark Continent.

Africa in Ancient Times.

At the beginning of the Christian era the world, as known to the Romans and their Mediterranean contemporaries, consisted of southern Europe, Britain, northern and north-eastern Africa and south-western Asia. That is, it mainly comprised the lands bordering the Great Sea, later appropriately called the Mediterranean. Thousands of years before this there were splendid temples, monuments and cities on the banks of the Nile—whilst it is over two thousand years since Carthage, the Phœnician city built near the modern Tunis, was destroyed by its great rivals the Romans. Three famous names in the history of Ancient Geography are Hanno, Eratosthenes and Ptolemy. *Hanno,* a Carthaginian Admiral, who lived about 500 B.C., is reported to have made a journey by sea from Carthage, through the Pillars of Hercules (the two great rocks at the Straits of Gibraltar), to Sierra Leone. The description of his journey includes accounts of mountainous coastlands, barren desert coasts, to the south of which there was a great headland green with trees, and a river inhabited by hippopotami and crocodiles. The identification of these features should not prove difficult. It is reported that he brought back with him hairy skins belonging to men and women whom he had captured on an island and who were known to the natives as gorillas! This voyage is a very remarkable one. Centuries later it was said: " Neither a fool nor a wise man ventures beyond the Pillars of Hercules." *Eratosthenes* was a Greek who lived in Alexandria some two centuries before the Christian era. He has been described as the founder of scientific geography, and was the first to attempt to calculate the size of the earth. The details of his calculations were given in Book II, where we saw that he reached the remarkably accurate estimate of 25,000 miles. *Ptolemy,* whose date we may fix as about A.D. 150, was also a Greek living at Alexandria. He pieced together all the knowledge of the world as then known, and produced the first map drawn on a framework of lines of latitude and longitude. He made, however, some important errors. He underestimated the circumference of the globe, and showed on his map what in the Latin versions of his works is called "terra australis incognita," or the unknown southland, whilst he said that the earth, and not the sun, was the centre of the solar system. The first error led to the great journey of Columbus, who thought the westward journey from Europe to Asia was comparatively short, and therefore when he reached the West Indies he believed that he was in the East Indies. The second mistake prepared the way for the great discoveries of Captain Cook, whilst his astronomical errors were finally abolished by Newton. Despite these drawbacks, his work is one of the world's greatest human achievements, and he had the unique distinction of being the greatest authority in geography and astronomy for some fifteen hundred years.

Africa in the Middle Ages.

During the Middle Ages, approximately the period from the fall of the Roman Empire to the period of Discovery, the Geographical Revolution, which opened towards the close of the fifteenth century, exploration was almost at a standstill, either by land or by sea. In the seventh century communications between Europe and North Africa were interrupted by the Arabs, who spread their conquests along the northern margin of the continent from Egypt to the Atlas region, from which they overflowed to Spain. That country was engaged in their expulsion during the greater part of the Middle Ages. But apart from the Arab conquests, there is not much of importance except the journey of the greatest of all Arab travellers, *Ibn Batuta,* a native of Tangier. His Asiatic travels rival those of Marco Polo. It was after he had returned from these that he worked his way through Morocco, crossed the Sahara and reached the Sudan. He travelled along the Niger, which he mistook for the Nile, and after visiting Timbuktu, returned to Tangier.

THE GREAT DISCOVERIES.

The period of discovery was heralded by the work of *Prince Henry the Navigator,* a Portuguese prince, whose mother was a daughter of John of Gaunt, so that he was a cousin of Henry V of England. Prince Henry, who had displayed great valour in the capture of Ceuta, opposite Gibraltar, gave his life to the problem of reaching the Indies by sailing round the south of Africa. With this object in view he established an observatory and school for the training of mariners at Cape Sagres (the "Sacred Head"), which we now call Cape St. Vincent. He invited map-drawers, sailors (especially Genoese) and shipbuilders to join him, and proceeded to send out expeditions along the north-west coast of Africa. This was no light task, for the sailors of the day were afraid of leaving the coast, owing to the mysterious tales of seas of slime and mud where vessels would stick, of the sun pouring down liquid flames on a boiling sea, of the dense fogs and mists which hid the edge of the world, which was believed to be shaped like a shield, and of the dangers of passing beyond Cape Nun, where white men were suddenly changed into blackamoors. But little by little he pressed on until at the time of his death at Sagres in 1460, one of his captains had reached the Cape Verde Islands and another the mouth of the Gambia. Others followed, until in 1487, five years before Columbus sailed, *Bartholomew Diaz* had rounded the Cape. From a point near the mouth of the Orange he left the coast and sailed southwards. Then on account of the cold he turned eastwards, and later, northwards. He struck the south-east of Africa, which he followed north-eastwards for another sixty miles. He had gone far enough to convince himself that he had rounded the southern extremity of the continent, so he turned back, partly owing to the refusal of the men to proceed further, and later had such great difficulty in rounding the south-west corner, owing to the strong, westerly winds of the southern winter, that he called the great headland Cape Tempestuoso (the "Cape of Storms"). The King of Portugal wisely changed it to the Cape of Good Hope. Thus, it had taken sixty-eight long, weary years to get from the Madeiras to the Cape, and still the Indies were far off. But the next Portuguese explorer, *Vasco da Gama,* was destined to work at a more rapid rate, for in 1492 Columbus had taught that the unknown seas had no horrible dangers for the careful navigator. He steered straight for the Cape Verde Islands, and from there out into the ocean until he finally reached a small bay a little north of Cape Town. The voyage was not without its hardships, for he was becalmed for three months in the doldrums, and for another three months was tossed about by the contrary south-east trades, which also gave him very considerable difficulty in rounding the Cape, for it was summer, whilst Diaz was there in winter. He spent Christmas Day on a shore which he called Natal in honour of the day, and after effecting repairs sailed along the East African coast, calling at Mozambique and Mombasa, where he met with a hostile reception from Arab traders. At Malindi he obtained an Indian pilot, who took the little fleet across to India in twenty-three days, for the south-west monsoon was blowing. The return journey from India to the African coast was accomplished whilst the monsoon was still blowing, and this time it took three months.

Vasco da Gama's journey opened a new era not only for Africa but for Europe as well. The news came as a great shock to the Turks and the Venetians, for both lost the greatest source of their riches: the Turks the taxes they levied on all merchandise crossing their dominions, the Venetians their profits gained by the distribution of that merchandise. Vasco da Gama completed the work of Prince Henry. The coastlines of Africa were now known, the lifting of the veil from the interior remained to be accomplished.

But not only did the Portuguese explore the coast of Africa, they established trading settlements on the east and west coasts. These gave to Portugal the command of the new route to the east and elevated her to the zenith of her power. Nor were other maritime countries lacking in their desire to establish stations on the highway to the East. The Dutch settled at the Cape in 1652, and a little later on the Gold Coast, whilst British settlements were made at the mouth of the Gambia and also on the Gold Coast. The British purchased the Dutch Gold Coast settlement and annexed that at the Cape in 1806, an action which was largely prompted owing to its great importance as a half-way house on the road to India. Considerable friction between the English and the Dutch or Boer settlers resulted in many of the latter trekking beyond the rim of the plateau to the High Veld, and led to the founding of the Orange Free State. Some descended into Natal, where they met with great opposition, both from Zulu tribes and British traders who had established themselves in Durban. After a temporary occupation, the Boers once more made a great trek, this time to the High Veld beyond the Vaal, and founded the Transvaal, whilst Natal became British (1843).

The Exploration of the Interior.

This began with the search for the sources of the Nile. Its continuation and practical completion have been very largely associated with the determination of the sources and basins of the four great African rivers: the Nile, Niger, Zambezi and the Congo. It is interesting to record that in the main this task has been associated with the work of British explorers, and it is therefore fitting that, except in the case of the Congo, the courses of these rivers are very largely under British control.

There was an ancient tradition that the Nile bent westwards in its middle course, and it was thought that the other great river of West Africa, the Niger, was part of the upper course of the Nile. *James Bruce,* however, in 1768 set himself the task of searching for the sources of the Nile in Abyssinia, and he thought when he worked his way to the sources of the Blue Nile that he had solved the question. On his return journey he followed the Blue Nile and the Nile from Abyssinia to Cairo. Bruce's expedition is interesting from another standpoint. His work was done from a purely scientific motive. He did not go to open trading centres or to discover new trading routes, which, of course, had been the object of the Portuguese. His journey inaugurated a period of exploration for the sake of adventure and discovery, although in the end it could not help but lead to the partition of the continent for purposes of conquest and trade. The discovery of the equatorial sources of the Nile was not accomplished until almost a century later, and is associated with the names of *Speke, Grant* and *Baker.*

Ten years after Bruce's discovery the *African Association* was formed, with the express intention of promoting the exploration of the interior of Africa; and in 1793 they placed in the hands of the intrepid Scotch doctor, *Mungo Park,* the task of reaching the Niger, of ascertaining its source and wealth, and of visiting the leading towns in its basin, particularly Timbuktu. Starting two years later from the mouth of the Gambia, he penetrated to the Sudan and reached the Niger, enduring untold hardships and privations, including capture by the Moors, but it was impossible to reach Timbuktu. In 1805 he made a second attempt, this time hoping to prove that the upper Niger reached the sea at the Congo mouth. The map of the time showed the upper Niger but no mouth, and the Congo mouth but no upper course. In his attempt, however, he lost his life, for, being attacked by natives, he made a bold fight, but was drowned in the Niger rapids near Bussa.

Now we come to *David Livingstone,* another Scottish doctor and the greatest of all African explorers. Starting from the Cape in 1849, he travelled northwards until, after many adventures, he reached the Zambezi, whose upper course he followed. Striking westwards he pushed towards the coast, and in 1854 reached Loanda, the Portuguese West African port. He was very ill, owing to the hardships of his journey, and the captain of a British cruiser wanted him to go to St. Helena to recover, but he refused to leave the faithful natives who had accompanied him. Soon he set off on the return journey. He took his followers back to their own land—they were Maholos who lived south of the Zambezi—and set out to follow the Zambezi to its mouth. In so doing he was not only the first European to see the Victoria Falls, but the first to cross Africa from coast to coast. He reached the east coast and sailed for England, sixteen years after his arrival at the Cape. But in 1858 he was back again, and set himself the task of exploring the Shiré tributary of the Zambezi. This led him to the discovery of Lake Nyasa in the following year. Later he discovered Lakes Mweru and Bangweolo and the river Lualaba, the Congo headstream, and then wandered for five years in the neighbourhood of Lake Tanganyika, which had been already discovered by Speke and Burton. Rumours reached England through his enemies—the slave traders—that he was dead, and in 1871 Stanley was sent by the proprietors of the *New York Herald* to find him. He found Livingstone very ill at Ujiji. When he got better the two sailed to the northern end of Lake Tanganyika, and proved that it was not one of the Nile's sources, for a river flowed into it and not from it. Stanley made his way to the east coast and returned to Europe. Two years later, amidst the swamps of Lake Bangweolo, on May 1, 1873, Livingstone, that "perfect Christian hero," was found dead in his tent.

Stanley carried on Livingstone's work and completed the exploration of the Congo, the fourth great river of Africa. He spent 1876 in his great work of following the Congo from the Lualaba to the mouth, thus proving that they were one and the same river, but his journey was destined to raise matters of great importance. His expedition had been financed by the King of the Belgians, and the question naturally arose, "Who shall control this vast area?" Ultimately the Congo Free State was established in 1882, and placed under the sovereignty of King Leopold II of Belgium.

THE PARTITION OF AFRICA.

Questions of ownership and of priority of discovery and settlement now became so urgent that it was clear that unless some international understanding was reached, great friction would ensue. The raising of these matters also coincided with Germany's appearance as an African colonizing power, for that country made claims to the Kameroons, south-west Africa, and later to Zanzibar. In 1884–85 a Congress assembled at Berlin, to determine the conditions by which the partitioning of the continent should be governed. In a very few years the various countries had settled most of their differences, and the greater part of the continent was partitioned between Britain, France, Portugal, Germany, Spain, Italy and Belgium. Later the boundaries between the possessions of different countries were definitely settled by boundary commissions. African troubles were not over, however, for in 1881 Britain had to suppress a rebellion in Egypt, in whose affairs she and France had interfered, and the Egyptian Sudan had to be temporarily abandoned from 1884 to its re-conquest by Kitchener in 1898, whilst in South Africa troubles with the Boers came to a head in 1899, when there broke out the South African War, which resulted in the addition of the Transvaal and the Orange Free State to the British Empire. In 1911 the French ceded a portion of their Congo possessions to Germany, in exchange for a recognition by that country of the French Protectorate in Morocco.

The defeat of Germany in the Great War (1914–19) brought to an end her short career as a possessor of African colonies, for the former German colonies have been handed over to the care of the League of Nations. The League's mandate to administer South-west Africa has been given to the Union of South Africa, that for East Africa to Great Britain, whilst Togoland and the Kamerun Protectorate have been mandated partly to France and partly to Britain.

Since Stanley's great journey the story of the exploration of Africa has been connected mainly with the spread of European influence, with the work of great chartered companies like the British South African Company, and the names of great empire-builders like Cecil Rhodes. It has thus had more of a political significance. The work accomplished by missionaries, the building of roads and railways, the sending of military expeditions and the penetration of the trader have led to missionaries, soldiers, engineers, and commercial men becoming explorers, whilst, in some instances, the work of those seeking sport in big-game hunting also merits recognition.

To-day in the whole continent there are only two independent countries, Liberia and Abyssinia. The former was, by design, made a home for freed slaves, whilst the geographical conditions, particularly of relief, have helped the inhabitants of the latter to resist the attacks of Europeans.

EXERCISES.

1. How far have the various African expeditions of discovery been prompted by motives of trade, conquest, or of pure scientific interests?
2. "Prince Henry's sailors soon reached Cape Bojador, but there was then a long delay. Once Cape Verde was reached, however, interest revived, although it took a turn which delayed further exploration." Give geographical explanations of these statements. Why were Capes Verde and Blanco so called?
3. Give geographical reasons why Africa remained the "Dark Continent" for so many years.
4. Whilst reading this chapter mark on a map of Africa the places mentioned and the routes taken by the various explorers.

CHAPTER IV.

THE ATLAS REGION.

Physical Features.

This region lies in north-west Africa, west of the Gulf of Gabes and north of the Sahara desert. Its parallel mountains, running from south-west to north-east, are part of the great system of folded mountains which almost surrounds the western basin of the Mediterranean Sea. Along the coastal margins of all three of the Atlas States there is the *Tell,* a belt of undulating country consisting of low ranges and fertile plains, and varying in width from fifty to a hundred miles. South of the Tell rise the ranges marking the northern boundary of the Atlas Mountains proper. In the north-west, the Er Rif Mountains form the eastern continuation of the Sierra Nevadas of south Spain, from which they are separated by the narrow Straits of Gibraltar (see Fig. 10). Farther eastwards, the Little Atlas, separated from Sicily by a broad but shallow strait, are part of the mountain system which extends through Sicily and the Apennines of Italy to the Alps. On the Saharan margins of the Atlas system are the High Atlas, whose peaks attain an elevation of over two and a half miles, the Anti-Atlas and the Saharan Atlas. Between these northern and southern mountain chains lies the high plateau of the Shotts. The whole area has a close structural resemblance to Asia Minor, a likeness which is further emphasized when the climatic and economic conditions are compared.

CLIMATE.

Over a large part of the Atlas region the climate is of the *Mediterranean Type,* but the varied relief causes strong contrasts, especially between the climate of the Tell and that of the plateau of the Shotts. The Tell enjoys very warm summers, and mild to warm winters, but the plateau suffers from extremes of temperature. The best watered parts are the Tell and the high mountain ranges to the north, but the plateau receives little rain.

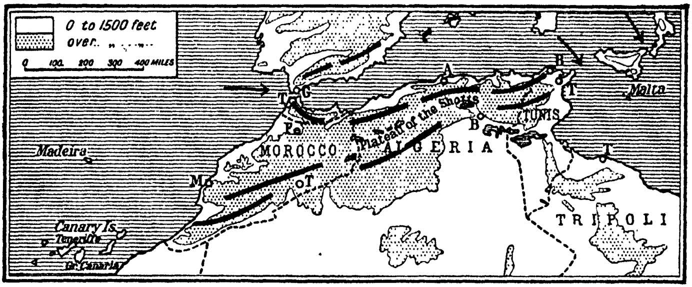

FIG. 10.—The Atlas region.

NATURAL VEGETATION AND CHIEF PRODUCTS.

In all the best watered parts the typical vegetation is of the Mediterranean type. The trees of the forests are cork oaks, olives and cedars on the lower slopes, with deciduous and coniferous forests on the upper slopes. But vast areas of forests have been destroyed, and trees are not so common as formerly. Many of the lower slopes of the mountains have been terraced and planted with olives, vines, mulberries, oranges, lemons and other fruits, whilst all these, as well as wheat and barley, are produced in the Tell, the most fertile part of the whole region. But even in the Tell it is often necessary to supplement the rainfall by irrigation methods. In Roman and Phœnician days, the Tell of Algeria and Tunis was one of the chief granaries in the Mediterranean region, the ruins of irrigation works, aqueducts and ancient cities testifying to the former importance of the region, and to the fact that the rainfall has probably decreased, even within historic times.

At best, the plateau is little better than a poor steppe-land, where camels, sheep, horses and goats are pastured, finding sustenance very largely in the sweet-smelling herbage which grows there. Alfa, or esparto grass, also covers much of the plateau. It is exported for use in the making of paper. South of the Anti-Atlas and the Saharan Atlas Mountains is the Sahara desert.

POLITICAL DIVISIONS.

The Atlas region comprises Morocco, Algeria and Tunisia, although each of these also includes, on its southern margin, a Sahara desert area. Algeria is a French colony, and sends deputies to the French Parliament. Morocco and Tunis are French Protectorates. By an agreement signed in 1912 France recognizes that Spain has the right of protectorship over a small strip of north Morocco opposite to Spain. This strip includes Ceuta, but not Tangier. The latter town and its district, an area altogether comprising about 140 square miles, has been decreed a special international zone.

MOROCCO.

Area=213,000 sq. miles.
Population=Estimated in 1931 at 5,300,000.

This country is still in a backward condition. Little attention is paid to irrigation; roads are poor and inadequate for modern purposes; there are few railways; the mineral wealth of the country is practically untouched; whilst it is almost impossible to attempt the settlement and development of the interior, owing to the lack of security, either of life or property. But the country is capable of very considerable development, and the French are giving this matter considerable attention in the part of the country under their control, especially as regards roads and railways. The coastal plains are covered in places with a black soil of great fertility, in which barley, maize, wheat and fruits are grown, whilst poultry-farming is also an important occupation. On the plateau a large number of cattle, sheep and goats are pastured. South of the Atlas, the most important region is the oasis of Tafilet.

Probably about one-half of the people live in the coastal plains, and consequently that is where most of the towns are to be found. *Fez*, the best known city, is situated in the upper valley of the Sebu River. *Marrakesh* (Morocco), the largest city and formerly one of the three capitals, stands at the foot of the High Atlas, in a rich, fruit-growing area whose extent could easily be increased by the adoption of irrigation methods. *Casablanca, Rabat* and *Tangier* are the chief ports.

ALGERIA.

Area=847,000 sq. miles.
Population=6,600,000 (920,000 Europeans) at 1931 Census.

This is the most advanced of the Atlas States. It includes three distinct regions—

(i) The Tell.
(ii) The high plateau of the Shotts.
(iii) The Saharan area south of the Atlas ranges.

The products of these regions have already been stated. In Algeria, the French have constructed over 2,000 miles of railway and many first-class roads. These were primarily built for military purposes, but they have also assisted the economic development of the colony. The chief railway traverses the Tell from Oran to Tunis via Algiers and Constantine, and sends branches to the Mediterranean ports of Bona and Philippeville, as well as to the oasis of Biskra. Westwards it is continued into Morocco.

The leading exports of Algeria are wine (the most important), wheat, sheep, barley, fruits, hides and skins, wool, cork, alfa grass, dates and minerals. Most of the minerals are at present found in the Tell region. Much iron ore is obtained from the mines, whilst zinc, lead and copper are worked in various places. In recent years, a great quantity of phosphate has been obtained, only a small part of which has been exported.

The capital and largest city is *Algiers,* on the sea-coast. It has a large trade with Marseilles, the nearest French port. Other ports are *Oran,* west of Algiers, and *Philippeville* and *Bona,* to the east of the capital. Philippeville is the port of *Constantine,* a very old city built on a high prominence overlooking the Tell, and so surrounded by deep ravines that it is a natural fortress. *Biskra* is noted for its date palms.

For the purposes of government Algeria is divided into two divisions called *Northern Algeria* (this comprises the Tell and the plateau) and *Southern Algeria.* Over 90 per cent. of the people are in the northern division.

TUNIS.

Area=50,000 sq. miles (approx.).
Population=2,400,000 (195,000 Europeans) at Census of 1931.

Tunis has the same physical units as Algeria (Tell, Plateau, Desert), so that its products may also be compared with those of its western neighbour, although the individual exports are not of the same relative importance in both states. In Tunis the chief export is phosphates, olive oil being second. The other leading exports are iron, lead and zinc ores, alfa grass, corn, hides and dates. All the minerals are being produced in quantities which increase yearly. The capital is *Tunis,* the centre of most of the foreign trade and the largest city in the Atlas region. It is built at the end of a very shallow lagoon, so that prior to the cutting of a canal through the lagoon in 1893, vessels were compelled to discharge their cargoes at a roadstead at the narrow mouth of the lagoon. Tunis is the natural outlet of the most important and richest river valley in the whole Atlas region, the valley of the Majerda. The ancient

Phœnician city of Carthage was situated about a mile and a half north-west of Tunis, and its ruins are still to be seen. The command of the sea passage between Sicily and Tunis is of great importance, owing to its situation between the western and eastern basins of the Mediterranean. In this connection notice the situation of *Bizerta,* a strong French naval station. The second city in Tunis is *Sfax,* on the coast south of Tunis, to which it is connected by rail.

THE ISLANDS OF NORTH-WEST AFRICA.

The groups of small islands off the north-west coast of Africa may be included with the Atlas region on climatic grounds. They are the Azores and the Madeiras, which belong to Portugal, and the Canaries, which are Spanish. They are all of volcanic origin, and on that account possess fertile soil, although the considerable destruction of forests has led to much of the soil being washed away. All these groups lie within the Mediterranean belt, so that they experience dry trade winds in summer and wet westerlies in winter. The Canaries, however, lie so far south that they are not affected by the winter westerlies so much as the other two groups, and on that account are much drier.

The Azores lie due west of Portugal, and consist of three groups of hilly, volcanic islands, rising from the shallow ridge which passes down the centre of the Atlantic Ocean. They have frequently suffered from earthquakes, whilst many hot mineral springs also indicate their volcanic character. They were discovered by the Portuguese in 1440, although in much earlier time they were known to Carthaginians and Arabs. The chief town is Angra, but the best harbour is at Horta. The typical products of the islands are Mediterranean fruits, especially oranges and pineapples.

The Madeiras, like the Canaries, rise from the comparatively shallow water near to the mainland. The group comprises several rocky islands, of which Madeira and Porto Santo are the chief, and the only inhabited ones. The Portuguese discovered Madeira in 1419, and introduced the vine, for which that island is now famous. All Mediterranean fruits are grown, as well as early vegetables, tobacco and sugar. The capital and chief port is *Funchal,* a port of call for steamers bound for South America or the Cape.

The Canaries, the "Fortunate Isles" of the Ancients, comprise several large islands and many small ones. The largest island, Teneriffe, is about the size of Warwickshire, and is noted for its great conical Peak of Teneriffe, which reaches an elevation of 12,200 feet. *Las Palmas,* the capital and largest town, is on the island of Grand Canary. It is an important port of call for vessels proceeding to Cape Town, India, and the Far East, via the Cape route. The islands are noted for bananas, fruits and wine, cochineal (the insect is reared on the leaves of the prickly pear), and early vegetables. At the present time almost all maps are drawn with their longitude reckoned from the Prime Meridian of Greenwich, but in former days, following the example of Ptolemy, the Prime Meridian was taken as passing through Ferro, the most westerly isle of the Canaries.

EXERCISES.

1. What is meant by a *Mediterranean Type of Climate?* Account for its peculiarities and show how the characteristic vegetation is adapted to the climate.

2. On pp. 37 and 38 will be found the leading exports of Algeria. Which of the vegetable products are grown in the Tell, which on the Plateau and which in the Desert? Why do the products of these regions differ?

3. Compare the Atlas region with Asia Minor in as many ways as possible.

4. Does the whole of the Atlas region comprise one natural region? Discuss this question as fully as you can.

5. Account for French influence in the Atlas region. In what ways has French occupation been of value (i) to the commercial development of the region, (ii) to the natives?

CHAPTER V.

THE SAHARA, INCLUDING LIBIA.

THE Sahara desert is the largest area of desert land in the world. Stretching from the Atlantic Ocean on the west to the Red Sea on the east, it includes the whole of North Africa north of the Sudan and south of the Atlas region, a vast area almost equal to that of Europe. Eastwards it is continued by the Arabian desert and the desert plateaus of Central Asia, so that there is an almost continuous stretch of desert from the Atlantic to the Pacific.

PHYSICAL FEATURES.

Structurally, the desert largely consists of horizontal sheets of sandstone and limestone, which in places have been pierced by crystalline rocks. Physically it is a large plateau, most of which is of a lower elevation than one thousand feet above sea-level. It reaches its highest elevations, 7,000–9,000 feet, in the belt of plateau highlands (the Tibesti Plateau) which diagonally crosses the central Sahara from north-west to south-east. The surface of the Sahara is very diversified and is by no means level. There are vast areas covered with sand, *e.g.* the Libyan desert; other areas have bold, flat-topped *mesas,* whose edges are high cliffs, whilst there are also large tracts of stony desert. On the sandy areas, travel is exceedingly monotonous, owing to the almost endless succession of sand dunes produced by the action of the wind.

CLIMATE.

The climatic conditions are illustrated by the figures given in the table in Chapter I. The summer is very hot, hotter than that of the equatorial region, the winter is warm to very warm, whilst the mean annual rainfall is everywhere less than ten inches, except in a narrow strip along the coast of Tripoli and in the peninsula of Barka. Over most of the area the total annual rainfall is very small indeed, and most of the rain which falls is brought by violent and sudden thunderstorms, whose occurrence is very irregular and uncertain. The differences between night and day temperatures are more marked than the seasonal differences, and lead to very important results. During the day the hot rays of the sun pour down upon a surface unprotected by vegetation covering, and cause the surface layers of exposed rocks to expand. When the sun sets, the nights, owing to the rapid radiation, are very cold and contraction takes place. This expansion and contraction of the surface layers produces splitting, and rock fragments fall to the ground, the smaller particles being carried away by the wind to be piled into sand dunes, the larger ones for the time remaining behind, but finally they, too, are reduced to sand. In this manner the sand of the Sahara has been produced. The great terror of the caravan traveller is the *simoom,* or desert sandstorm, a cyclonic disturbance which carries along with it great quantities of sand, which at the best fills the ears, eyes, mouths and noses of unfortunate travellers and camels, and at the worst completely buries them beneath heaps of sand. No wonder that the great caravan routes have been spoken of as being paved with human bones!

VEGETATION AND THE OASES.

The Sahara has many water-courses called wadis (= water), but very rarely are they filled with water for any considerable time. It is quite a mistake to think of the desert soil as infertile, for wherever water is found, or even after a shower of rain or a heavy fall of dew, vegetation springs up. The great cause of the lack of vegetation is the lack of sufficient moisture. Along the semi-desert margins of the Sahara, and on the outskirts of oases, dry, coarse grasses are found, and there, nomadic tent-dwellers rear herds of sheep, camels and goats, although their life is somewhat precarious, and frequently they have been driven to raiding and plundering the more fortunate inhabitants of the oases. The oases are situated in places where there are permanent supplies of water, as along lines of depression, or along the flanks of the Tibesti Highlands, or where, owing to the geological structure of the rocks, water reaches the surface. In the Algerian Sahara, the French have actually created oases by the sinking of artesian wells. It is only in the oases that settled life is possible, so that only there do we find permanent habitations. The date palm, a very important food-tree, and quite indispensable to the desert dweller, is cultivated in all the oases, whilst in those whose water supply is regular, cereals, especially wheat and barley, pulses and fruits are grown.

THE OASES AND ROUTES.

In 1923 the Sahara was crossed by a specially constructed motor-car, but it is still true that for present practical purposes travel on the Sahara would be almost impossible were it not for the oases and the camel, the ship of the desert. The oases act as stations on the way, where provisions and water may be obtained, and the camel is the only possible beast of burden, being peculiarly adapted for walking on sandy surfaces, as well as being able to go without food and water for a few days. A journey across the Sahara from the Mediterranean Sea to the Sudan is no light task and requires quite a lot of organizing. Travel by caravan has greatly declined in recent years: one reason being the practical extinction of the slave trade, which formed the most valuable trade of caravans of days gone by; another being the improved means of railway communication between the Sudan and the west coast of Africa, so that much of the trade which formerly crossed the desert by caravan is now carried both more quickly and more economically by sea. Indeed, transport by camel, as by all animal agencies, is very costly. The average camel carries from three to four hundredweights, from which it will be seen that a relatively small steamer will easily carry as much as ten thousand camels, and will also effect a quicker delivery.

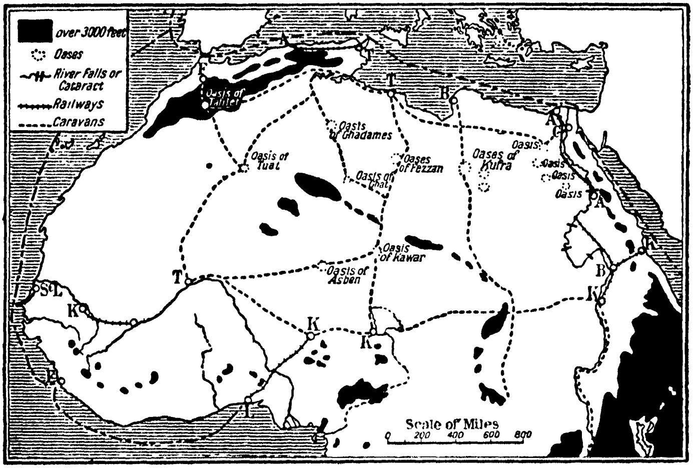

FIG. 11.—The chief Saharan caravan routes.

Fig. 11 shows the chief Saharan caravan routes. It will be seen that they use as calling-places oases lying in the following depressions: (*a*) that extending westwards from Cairo; (*b*) that extending along the southern margins of the Atlas Mountains; (*c*) that lying between the northern end of the Tibesti plateau and the Atlas ranges, and including the Wargla and Twat oases; (*d*) that extending from the oasis of Twat to Timbuktu;

and (*e*) those along the flanks of the Tibesti Highlands. More important than any of these is the route along the banks of the Nile, which forms a continuous strip of oases right across the Sahara.

ITALIAN LIBIA.

Area=420,000 sq. miles (estimated).
Population=718,000 (estimated in 1931).

Libia has belonged to Italy since 1912. Before that date it formed part of the Turkish Empire. For administrative and military purposes it is divided into two independent districts, Tripolitania and Cyrenaica. The best watered parts of the country are the coastal strip of Tripolitania and Cyrenaica (peninsula of Barka), which could very well be classified with the Tell region, since they have the same leading features of the Mediterranean type of climate and the same characteristic products. The extensive Roman remains point to the fact that by careful irrigation both of these areas were formerly more productive than they are to-day, but it is also probable that in those days the rainfall exceeded that at present received.

Tripoli, whose inhabitants number about 86,000, is the chief city of Tripolitania. It is the starting-point of many caravan routes, partly owing to the fact that the deep indentation of the coast gives it the shortest desert crossing from north to south. Away from the coast the only important towns are in the oases, of which Ghadames and Murzûk are the most noted. *Benghazi,* the port and chief city of Cyrenaica, is the starting-point of caravan routes proceeding southwards via the oasis of Kufra to western Anglo-Egyptian Sudan. Cyrenaica is noted for its olives and cypresses. It has abundant pasturage, and cattle could be bred there on a much larger scale than at present. " Mediterranean products," sponges and tobacco are very important exports from Tripoli.

In 1931 there were about 44,000 Italians in Libia, and a considerable proportion of these were farmers who have received government assistance in order to take part in an effort to develop Libia by means of Italian colonists. The new settlements are in the coastal area and have been greatly helped by irrigation and transport schemes. Already extensive olive gardens, vineyards and groves of oranges and lemons have been laid out, and considerable quantities of market garden produce are exported.

The political value of a strong Italian settlement under Italian rule on the shores of North Africa is obvious.

EXERCISES.

1. Where are the great hot deserts of the world? Account for their position. Give a brief description of the appearance of any one of them (preferably the Sahara).
2. What would be the probable composition of the "cargo" of a caravan journeying from Tripoli to Timbuktu? How would the "cargo" on the return journey differ from that carried on the outward journey?
3. What are the chief difficulties of desert travelling? How can they be partly overcome? Illustrate your answer by reference to travel on the Sahara.
4. What is an artesian well? How is the water obtained and how can it be utilized?
5. Read the last sentence of the first paragraph on page 42. Give another reason besides the one referred to. It is mentioned on the following page.
6. In what sense is it correct to say that the real boundary between Africa and Europe is the Sahara Desert, not the Mediterranean Sea?
7. Find out all you can about life in an oasis town or village. Then write out your material as a connected geographical account.

CHAPTER VI.

THE NILE LANDS.

THE Nile is one of the largest rivers in the world. It is certainly one of the most remarkable. It has its source in three great lakes (Victoria, about as big as Scotland, Albert Edward and Albert), situated near the equator. Its general direction is northwards, so that since its mouth is 32° N. of the equator it flows across three distinct belts, equatorial forest, tropical grassland and desert. For the last 1,800 miles of its 4,000-mile journey from source to mouth it does not receive a single tributary, and yet it is in that part of the basin that the famous annual Nile floods occur.

Lake Victoria, 3,700 feet above sea-level, occupies a depression in the high plateau of East Africa, and Lakes Albert Edward and Albert lie on the floor of the western rift valley, the former at an elevation of 3,200 feet, the latter at 2,200 feet. It will thus be expected that the two feeders entering Lake Albert will be interrupted by rapids and waterfalls, *e.g.* the Murchison Falls, situated where the stream from Lake Victoria descends the escarpment of the rift valley just before reaching Lake Albert. Soon after leaving Gondokoro (1,465 feet above sea-level) there is an abrupt change of level. The river now crosses the low plateau of the Sudan, and as it falls only 215 feet in its 1,000-mile journey between Gondokoro and Khartum, it becomes a broad, sluggish stream, forming large lagoons choked by sudd or floating marsh vegetation, which very considerably hampers the navigation of the river. In this part of its course the Nile receives the important Blue Nile and Atbara tributaries which rise in the high Abyssinian plateau lying to the east of the basin. Between Khartum and Aswan the river falls nearly 1,000

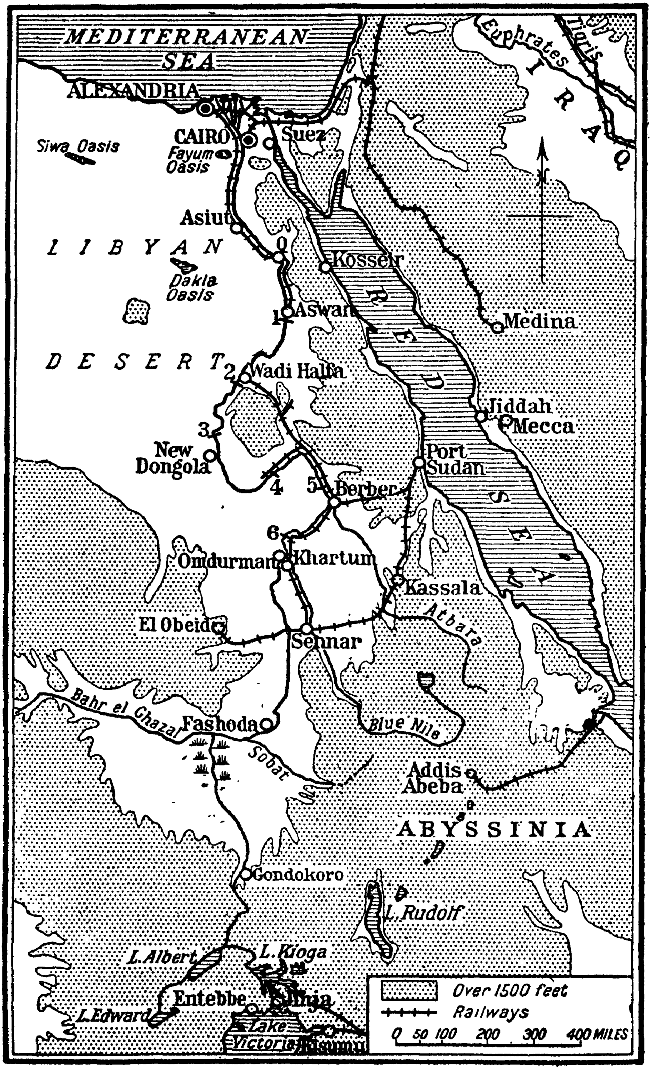

FIG. 12.—Map of the Nile Basin.

feet, chiefly in six cataracts caused by transverse reefs of granite and other hard rocks (see Fig. 12). These cataracts impede navigation, except at the flood season, when they are covered with water. Of the six cataracts only one, the first, is in Egypt. Below Aswan the course again becomes gentle, and the river is navigable right to the sea, but the valley, the famous Nile Valley, is very narrow, and shut in by high cliffs. Below Cairo the river has created a great delta, but the only navigable distributaries are the Rosetta and Damietta, for at the mouths of the others are lagoons, cut off from the sea by great bars of sand.

CLIMATE.

The following table will assist the consideration of the varied climates within the Nile basin. The exact situation of each town should be located on the map.

Town.	Height in Feet.	January Temp.	July Temp.	Rainfall in Inches.
Entebbe (North of Lake Victoria)	3,900	73° F	69° F.	59 (wettest periods just after the equinoxes).
Addis Abeba (Abyssinia) . .	8,000	58° F.	61° F.	48 (summer rains).
Khartum . .	1,250	70° F.	89° F.	15 (summer rains).
Aswan . . .	360	60° F.	93° F.	0 (dry at all seasons).
Cairo . .	100	54° F.	86° F.	1.5 (dry at all seasons).
Alexandria . .	100	58° F.	79° F.	8.5 (winter rains).

In the region of the equatorial sources of the Nile, the heavy rainfall plus the drainage of the permanent snowfields of the Ruwenzori group ensure that the discharge of water from Lakes Victoria, Albert Edward and Albert will be fairly regular. It is indeed sufficient to support the flow of water right to the mouth, despite the great loss due to evaporation and other causes which occurs in the desert belt.

On leaving the lakes plateau the river enters upon a region of summer rainfall. At first the fall is heavy (the Bahr-el-Ghazal area contains forests), but later, as is seen by the figures for Khartum, it decreases to about 10 to 15 ins. In Abyssinia, however, the summer rains are heavy, so that the Blue Nile and the Atbara, rivers whose beds for the greater part of the year are only occupied by pools in their deeper parts, are at this season carrying enormous quantities of water to the main stream. It is the extra summer rainfall, brought in by the tributaries, Bahr-el-Ghazal, Sobat, Blue Nile and Atbara, and in particular by the two last-named rivers, which, added to the perennial water brought from the equatorial sources, causes the great wonder of the Nile floods, for the remainder of the course of the river is across a desert receiving practically no rain, except in a narrow strip along the coast, where there are light winter rains.

THE NILE FLOODS AND AGRICULTURE.

Egypt has been aptly named the "Gift of the Nile," for without that river and its floods, practically the whole country would be desert. Even as it is, the cultivated portion is only a long, narrow, oasis strip following the river. The Nile, below its junction with the Atbara, is lowest in May, when most of its waters are received from the equatorial sources. From the middle of May onwards, and attaining a maximum about the end of August or early September, the Abyssinian tributaries are sending large quantities of water to the main stream. At Aswan the Nile begins to rise towards the end of May or the beginning of June, and continues to rise until the middle of September, when it begins to fall. At Cairo the maximum is reached about the middle of October. The rising of the Nile is very anxiously watched. A poor Nile rises about twenty-one feet at Cairo, an average Nile about twenty-five feet, whilst if the summer level increases more than twenty-eight to thirty feet, embankments are in great danger of being broken down, and have to be watched both night and day. It is hardly to be wondered at that there are many ancient gauges or scales by which the rise and fall of the river were, and still are, carefully measured. The flood waters remain on the land for about seventy days, and at the end of this time, as Shakespeare makes Mark Antony say, " The seedsman upon the slime and ooze scatters his grain."

Two distinct types of irrigation must be noticed. They are the *Flood Irrigation* and the *Perennial Irrigation*. The former system, also known as the basin system, is one which has been in use from the time of the Pharaohs. The land on each bank of the river is divided by earth banks into a number of basins all connected by shallow canals which lead the water from basin to basin, those basins farthest from the river receiving the water last. The waters cover the basins to a depth of from three to five feet, the level gradually falling as the floods subside, leaving behind a film of fertile silt. As it is November before the land is ready for planting, it is clear that only winter crops can be grown on land irrigated by this method, for in summer the floors of the basins are baked hard and cracked by the heat of the sun. The chief winter crops are wheat, barley, clover (for cattle), and pulses (peas, lentils and beans).

The crops for which Egypt is most famous are summer crops, but in order to provide water for irrigation at a time when the Nile is low, a perennial system had to be adopted. The methods of ancient Egypt, methods also in use to-day, were to raise water from the level of the river to the fields by means of *shadufs* or water-lifts, and water-wheels turned by the patient ox. But by means of these it is only possible to irrigate a comparatively small area. In order to increase the area under perennial cultivation great dams have been built across the river. This ponding of the waters gives a head of water, which forces some of it along deeply cut canals, from which in turn it is led by smaller canals to the fields. These canals are filled naturally in the flood season, and artificially when the Nile is low, so that the fields which they serve are capable of producing crops at all seasons. Of course, when the Nile is in flood, the sluice gates of the dams are open. They are shut towards the end of the floods and gradually opened as the next year's flood waters appear.

The Nile was first dammed or barraged at the apex of the delta, but the system has been extended to Upper Egypt, where the dam at Aswan is one of the finest of its kind in the world. It is supplemented by a second regulating dam at Siut. The Egyptian Government is now carrying out a scheme for heightening the Aswan dam, which when completed will increase the depth of the water in the reservoir and make it possible to extend the cultivated areas. The *Fayum,* an irrigated region west of the river and to the south of Cairo, receives its supply of water from the Bahr-el-Yusuf (River of Joseph), which is in turn supplied from the ponded water behind the Siut dam. The *Gezira,* the land between the converging White and Blue Niles, is irrigated by water held back by the great dam near Sennar.

The chief summer crops of Egypt are cotton, sugar, rice, millet and maize. Of these, cotton is easily of greatest importance, and accounts for about four-fifths of the total exports. Besides the cotton itself, the seeds are also of great value. They are crushed for oil, which is used as a cooking substitute instead of the dearer olive oil, as well as for the manufacture of soap and oilcake, the latter for cattle. Rice, millet and maize are planted at the time when the Nile is high.

ROUTES.

The Nile forms the only continuous waterway from the East African plateau to the Mediterranean Sea. It becomes navigable near Gondokoro, where it enters upon its Sudan course, but for some considerable distance the sudd makes the task a very difficult one. Between Khartum and Aswan the river is navigable except for the cataracts which impede all important traffic, although during the flood season it is possible for river vessels to pass the first and second cataracts, which are situated at Aswan and Wadi Halfa respectively. Indeed, the first cataract now offers no difficulty at any time, since a canal has been constructed in order to avoid the Aswan dam and rapids. Throughout the whole of Egypt, *i.e.* below Wadi Halfa, the river offers a continuous and uninterrupted waterway. In the delta the mouths of the distributaries are generally blocked by sandbars, and the only navigable channels are the Rosetta and Damietta distributaries.

Next in importance to the river come the railways. Railways connect the leading ports and towns of the delta with Cairo, from which the chief railway of the Nile basin runs southwards, following the river to Aswan. Between Aswan and Wadi Halfa there is no railway, and travellers proceeding southwards use river steamers. From Wadi Halfa, the first Sudan town, the line strikes across the Nubian desert to Abu Hammed, in order to avoid the river's great bend. The effect of the river in keeping the chief means of communication close to it is seen in the fact that a great part of the section between Wadi Halfa and Abu Hammed has now been followed by railway, and it is not improbable that, despite the longer distance, this river line may eventually supersede the desert line. Between Abu Hammed and Khartum the line follows the river very closely, and from a point south of Berber sends an important branch line to Suakim and Port Sudan on the Red Sea. This branch line carries thousands of pilgrims journeying to Mecca, the holy city of the Mohammedans. Beyond Khartum the railway follows the Blue Nile to Sennar, turns westwards, crosses the Nile and then goes on to El Obeid, some hundred and fifty miles west of the river. Here it is easier to leave the Nile, for the desert has been left behind and the savannahs entered. Fig. 12 shows a new line which has been built from Sennar to Port Sudan.

Besides river and railway routes, transport by camel caravan is very important, and is imperative when journeys into the desert have to be made.

EGYPT.

Area=About 383,000 sq. miles.
Cultivated and settled area 13,500 sq. miles.
Population=14,168,000 (Census of 1927).

Egypt may be divided into three regions—

(i) The Valley of the Nile.
(ii) The Nile Delta.
(iii) The Deserts.

Excepting in the oases the whole of the inhabitants are concentrated in the first two regions. The convex sea-front of the delta measures about 150 miles, the depth from that front to the apex is about 100 miles. It has been estimated that the alluvial soil brought down by the Nile increases in depth at the rate of four and a half inches in a century. In the south part of the delta the soil is extremely fertile, but the north is sandy and marshy. It was in the delta and the lower Nile valley that the civilization of Ancient Egypt grew and flourished. Egypt possesses little or no grazing lands, so that even to-day the one essential occupation is agriculture, and the question, "How high will the flood-water rise?" is asked as anxiously as ever it was in the past.

The capital of Egypt is *Cairo,* the largest town in Africa. The importance of its position lies in the fact that it is placed at the apex of the delta at the meeting-point of routes from Alexandria and Port Said, and from all parts of the delta lying between these places, with river-side routes coming northwards from Upper Egypt and the Sudan. The importance of this position is shown by the fact that the sites of the cities of Memphis and Heliopolis, earlier capitals, were close to that of the present capital. Other capitals have been Alexandria and Thebes, the first on the Mediterranean, the second on the Nile, where the river is closest to the Red Sea. It is clear that although each of these has obvious advantages of site, neither is so well placed for being the capital city as Cairo. Near to Cairo are the famous Sphynx and the Pyramids. Few domestic buildings of Ancient Egypt remain, for they were built chiefly of mud and bricks, but some of the great monuments, built of hard building stone, in which the country is very rich, are still in an excellent state of preservation, due in no small measure to the dry atmosphere. In the winter-time the sights of Egypt bring large numbers of tourists, who make their headquarters in Cairo.

Alexandria, the chief port, was founded by Alexander the Great in 332 B.C. Built on a strip of land, an island in Alexander's time, separating the sea from a lagoon or lake, it lies to the west of the delta. In this part of the Mediterranean the currents are easterly, so that Alexandria is freer from the deposition of silt than it would be if placed farther east.

Of the towns of Upper Egypt, *Aswan* is the most important, especially from the strategic point of view, for in this connection the construction of the great dam has made it one of the key towns of the country.

Egypt is now a sovereign state ruled by its native king, but Britain has reserved certain rights chiefly in order to secure command of the Suez Canal route to the east. Under Turkish rule the country was greatly neglected, but during British occupation great progress was made, particularly in the direction of the better utilization of water for irrigation purposes. Unfortunately the native cultivator is very ignorant, and it is not easy to get him to maintain the quality of the crops. Another reason for deterioration has been the growth of insect pests, due to the widespread destruction of bird life.

Egypt is of great importance to the British, for the Suez Canal, which is in Egyptian territory, is the main highway between Britain and the far eastern parts of the Empire (India, Australia, etc.). This canal was opened in 1869 and is nearly 100 miles long. Fig. 13 shows that it runs through several large lakes. The width of the bed is 121 feet, the depth 31 feet, whilst the time taken to pass through varies from ten to twenty-four hours. About three-fifths of the vessels using [illegible] British. Owing to the high [illegible] ssengers, many vessels find it cheaper to take the longer Cape route. The making of the Suez Canal greatly increased the trade between the countries of western and Mediterranean Europe on the one hand and those of Asia and Australasia on the other, and opened up once more the ancient routes to the East which were interrupted by the Turks when their conquests spread over the lands of the eastern Mediterranean. *Port Said,* at the Mediterranean entrance, is a coaling station with a busy entrepôt trade. Near the centre is *Ismailia,* where the railway from Cairo joins the one following the canal. *Suez* is an Arab town, near to the southern end. The construction of this great artificial waterway has affected this squalid town very little indeed. The canal zone is supplied with fresh water by a fresh-water canal from the Nile (see Fig. 13).

THE SUEZ CANAL

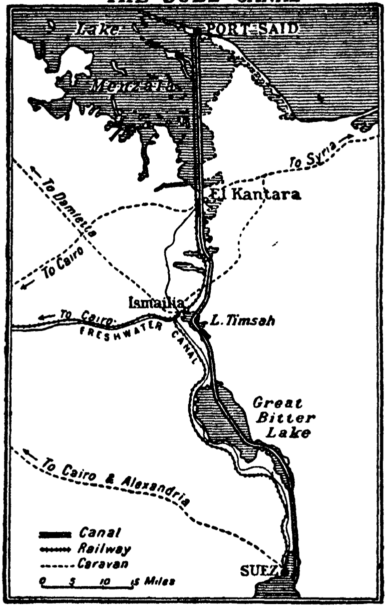

FIG. 13.

ANGLO-EGYPTIAN SUDAN.

Area=1,014,400 sq. miles.
Population=5,600,000 (estimated in 1931).

This large, undeveloped country has been under the joint control of Britain and Egypt since 1899. It formerly supported a population estimated at nearly ten millions, but this was reduced to about two millions by the depredations of Dervishes. The country falls naturally into the following regions:

(i) The Desert North, including the Red Sea littoral.
(ii) The Belt of Savannahs, including the transition area of scrub between the desert and the true savannahs.
(iii) A southern region, largely forested, but also containing grasslands.

In the first region, approximately north of the seventeenth parallel, settlement is confined to the immediate vicinity of the river or to the scattered oases, and the inhabitants are engaged in agriculture resembling that of Upper Egypt.

The second area forms a part of the vast savannahs stretching across Africa from west to east. The scrublands produce large quantities of acacia gum, whilst agriculture is carried on near the river, as well as by nomadic tribes who cultivate the land during the summer rains. The rearing of ostriches, sheep and goats is also carried on. Cattle are reared on the better watered grasslands. Between the waters of the converging Blue and White Niles lies a large plain called the *Gezira* (= island). This area is now irrigated by water held up by a great dam built across the Blue Nile five miles south of Sennar and then distributed to the fields by canals. The Gezira now produces large quantities of the finest cotton, and new direct railway connections via Kassala have been made to Port Sudan, the port of export (see Fig. 12, and Exercise 6 on page 58).

In the southern part of the country the Bahr-el-Ghazal province produces rubber and ivory, which at present form its chief exports.

The capital city of the Anglo-Egyptian Sudan is *Khartum,* situated at the confluence of the Blue and White Niles at a point where many routes reach the Nile. It has been well called the key, not only of the Sudan, but of Egypt. Its railway connections have been noted already. On the other side of the White

Nile from Khartum is the native town of Omdurman, where, in 1898, Lord Kitchener won the great battle which wrested the control of the Sudan from the hands of the Dervishes. Other important river centres are *Wadi Halfa* and *Berber,* both in the northern part of the country and very important on account of the routes they control.

EXERCISES.

1. Draw a map of the basin of the Nile. Shade the land which is over 300 feet. Mark in blue those rivers which bring down the summer flood waters. Mark the dams and the positions of the chief cities.

2. Analyse the sites of the following cities in such a way as to bring out the importance of geographical factors which have influenced their growth: Cairo, Alexandria, Khartum. Draw sketch maps to illustrate your answers (see Fig. 33).

3. "Egypt is the gift of the Nile." Write a short essay on this subject.

4. How did Britain obtain power in Egypt? In what ways was the country improved by having been under British rule? What measures of control does Britain still hold?

5. Why do you think it was that one of the world's earliest civilized communities appeared on the banks of the Nile? What traces of the past greatness of Egypt still remain?

6. "Nearly half a million acres are now irrigated in the Gezira. The extension of this area is contingent upon agreement with Egypt, for, obviously, unregulated control of the Blue Nile must have serious effects upon cultivation in Egypt." Discuss this, noting that the Sudan Government has guaranteed to Egypt the use of all White Nile water.

CHAPTER VII.

THE EASTERN HORN OF AFRICA.

THE Eastern Horn of Africa is a picturesque name for the great irregular projection of land south of the Gulf of Aden and the southern Red Sea. It includes Abyssinia, Eritrea and Somaliland.

PHYSICAL FEATURES.

The most striking feature is the Great Rift Valley which crosses the region from N.-E. to S.-W. (see Figs. 2 and 14). The Red Sea and the Gulf of Aden occupy rift valleys which meet in the triangular lowland immediately south-west of the Straits of Bab-el-Mandeb. This lowland possesses every evidence of volcanic activity. The rift valley is then continued south-westwards, its position being indicated by the Lakes Abaya, Stefanie, Rudolf, Baringo and Nyasa, all of which are on its floor. North-west of this valley the Abyssinian plateau rises to an elevation of about 8,000 feet, whilst its volcanic peaks reach as high as 15,000 feet. On the east, this plateau, which is largely volcanic, descends very abruptly to the triangular lowland already mentioned. South-east of the rift valley the plateau gradually descends to the coastal plains of Italian Somaliland. Its northern edges are abrupt and overlook the rift valley and the Gulf of Aden. The island of Socotra is a detached portion of the Eastern Horn.

CLIMATE.

The climate, like the relief, is very varied, and is much affected by elevation. On the Abyssinian plateau there is little range of temperature (see figures for Addis Abeba, p. 49), owing to the nearness of the equator, but the temperatures are much lower than on

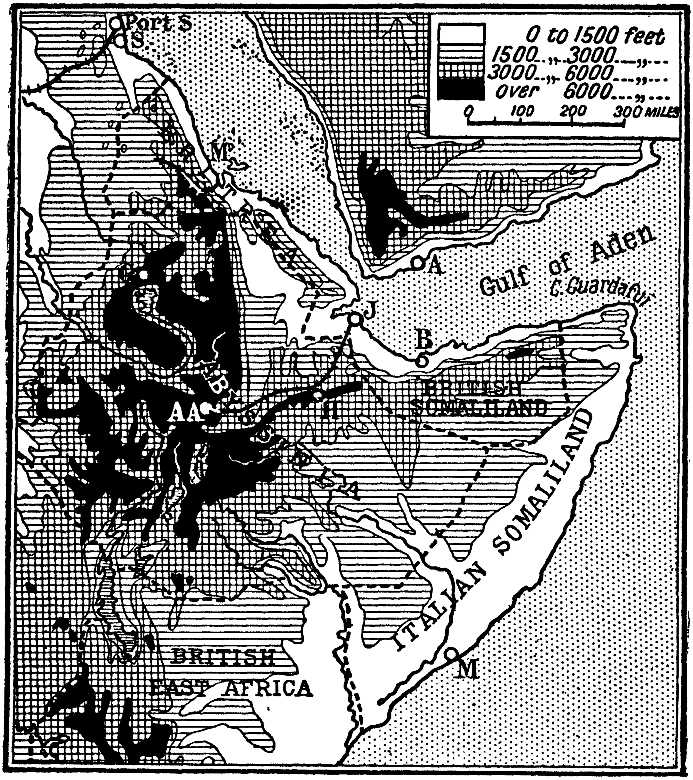

FIG. 14.—The Eastern Horn of Africa.

the coastal margins, where the winters are hot and the summers very hot. Everywhere the rains occur in summer, but in very differing amounts. Abyssinia is well watered, but elsewhere the rainfall is very little, ranging from seven to ten inches in Eritrea to a very small rainfall indeed in Somaliland, to which neither the S.W. winds of summer (the Indian monsoons) nor the N.E. winter winds, both of whose directions follow the trend of the coast, can bring much moisture.

NATURAL VEGETATION.

The varied climatic conditions produce varied vegetation types. The deep valleys of the Abyssinian highlands are clothed with dense tropical and semi-tropical vegetation, the prevailing type being bamboo forest. On the high tablelands, temperate forests and grasslands are found. Elsewhere the slight rainfall is incapable of supporting much vegetation, and the prevailing type is that of a poor scrubland, the majority of whose inhabitants are nomadic and are employed in tending herds of camels, horses and sheep.

ABYSSINIA.

Area=350,000 sq. miles.
Population=6,000,000 (estimated).

Abyssinia owes its independence very largely to its relief. It is mainly a plateau built up of sheets of volcanic basalt into which the rivers have cut deep gorges which offer very poor means of communication, so that intercourse is difficult, not only with the outside world, but also between different parts of the country. Indeed, in order to cross many of the rivers it is necessary to descend 4,000 feet or more from the plateau level. Abyssinia has thus been easily defended by its warlike people, and at the same time its isolation has enabled it to maintain down to the present a form of Christianity, now much debased, which was introduced in the fourth century, whereas the surrounding lands have become Mohammedan. Other results are seen in the fact that the country is only partially known even to-day, whilst the numerous dialects of the different provinces make it difficult for the people of one province to understand those of another.

The country comprises three types of region:—

(i) The *Kolla,* up to 5,000 to 8,000 feet.
(ii) The *Woina Dega,* from 5,000 to 8,000 feet.
(iii) *Dega,* above 8,000 feet.

The first region has a tropical climate and produces cotton and coffee. Abyssinia is the home of the coffee plant, which grows wild in the province of Kaffa, from which it derives its name. The second region has a warm temperate climate and produces the cereals and fruits of the Mediterranean lands. In this region, which also has pastures supporting large herds of cattle, most of the inhabitants are found. The higher region, the Dega, is almost entirely pastoral and supports horses, sheep and goats. The country is known to be rich in minerals, but there is little mining.

Abyssinia has very little trade with the outside world. The chief exports are hides and skins, coffee and ivory. Cotton goods form the leading import. Roads are mere tracks and most of the transport is effected by means of mules, pack-horses and donkeys. A railway (1 metre gauge) runs from the French Somaliland port of Jibuti to Addis Abeba, while the Italians have granted port facilities at Assab. These will do something towards opening up the country. Excepting *Harar,* overlooking the rift valley from the south, there are few towns in our sense of the word. Even *Addis Abeba,* the capital, is merely a collection of villages, etc., scattered round the royal palace, the whole measuring some three miles in diameter. It lies north of the rift valley. *Gondar,* in the north, is the ecclesiastical capital.

ERITREA.

Area=45,783 sq. miles.
Population=622,000 (Census of 1931).

This Italian possession stretches for about six hundred and seventy miles along the western margin of the Red Sea. The north, a part of the Abyssinian plateau, is a pastoral region, the south chiefly salt desert and scrub. Most of the inhabitants are nomadic shepherds. The capital and port is *Massawah,* on a small coral island. From Massawah a railway runs inland to Asmara.

SOMALILAND.

Somaliland is divided into French, British and Italian territories. It is a very dry region, largely covered with scrub, and may be compared with the southern margins of the Sahara, both as regards its leading occupations and its chief products. Many of the inhabitants are nomadic shepherds, who wander with their herds of cattle, sheep, horses, camels, ostriches and goats. Hides and skins, ostrich feathers, frankincense and other products of gum-trees are the chief articles of trade. In some of the better watered parts it is possible to grow maize and other cereals.

French Somaliland is a small territory at the head of the Gulf of Aden. Its chief importance lies in its strategic position, and in the fact that its port, Jibuti, is the outlet of southern Abyssinia, to which it is connected by rail. *British Somaliland* exports all the products mentioned above. Its chief port, Berbera, has a certain strategic value, due to its nearness to the southern entrance to the Red Sea. The richest part of *Italian Somaliland* is the middle basin of the Webi, where the best pastoral lands are situated. The chief port is *Mogadisho. Socotra,* an island about one hundred and fifty miles east of Cape Guardafui, is British and is noted for its aloes.

QUESTIONS.

1. What geographical factors have helped to isolate Abyssinia?
2. Notice the River Webi. Can you account for the peculiar direction it takes in its lower course?
3. At what time of the year may ships proceeding from Europe to Australia pass north of the island of Socotra in order to get a few hours' shelter from strong winds? Why?
4. Why are cultivators in the Sudan and in Egypt interested in the rainfall of Abyssinia?

CHAPTER VIII.

THE SUDAN.

PHYSICAL FEATURES.

THE word Sudan means "Land of the Blacks," and is the name given to the vast area bounded on the north by the Sahara desert and on the south by the equatorial forests of the Guinea Coast and the Congo basin. In an east and west direction it extends from Cape Verde to the Abyssinian plateau. Its northern and southern boundaries are very difficult to draw with any degree of accuracy, for in the north the desert merges almost imperceptibly into the Sudanese savannahs, whilst in the south the savannahs gradually change to equatorial forest.

The Sudan is a portion of the great, low plateau of North Africa. Most of the region lies between 600 and 1,500 feet, but there are considerable plains of lower elevation than 600 feet, situated on the west coast in the lower basins of the Senegal and Gambia rivers.

CLIMATE.

Town.	Height in Feet above Sea Level.	Mean January Temp.	Mean July Temp.	Mean Annual Rainfall in Inches.
St. Louis . .	16	70° F.	81° F.	17
Kayes (Upper Senegal River) . .	200	77	85	28
Timbuktu . .	820	71	90	9
Khartoum . .	1,250	70	89	15

An examination of these typical figures shows that the winter or cool season is very warm and the summer or hot season very hot—hotter than in the equatorial forest farther south. On the average, the high mean annual temperature of 80° F. is reached, whilst on individual days summer temperatures exceeding 100° F. are common. As in the Sahara, the daily range of temperature frequently exceeds the seasonal range.

The rains are confined to the summer months. The amount diminishes from south to north, being from forty to sixty inches on the margin of the equatorial forests and about ten inches on the desert borderlands.

NATURAL VEGETATION.

The Sudan is a tropical grassland transition belt between the desert to the north and the equatorial forest to the south. Trees, especially euphorbias and baobabs, do grow in the savannahs, but, excepting in the wetter hollows or along rivers, they are found in clumps, giving to the region the appearance of a natural park land. As may be expected from the distribution of rainfall, the northern margins differ very considerably from the southern margins. As the desert is approached, the vegetation is of a very dry character and consists chiefly of thorny scrub, acacias, aloes and cactus. Towards the south the heavier rainfall causes the savannahs to approximate gradually to equatorial forest.

CHIEF PRODUCTS AND OCCUPATIONS.

These vary in different parts, but as a rule the Sudan is essentially agricultural, except in the north and east, where the rainfall tends to be insufficient for agriculture, unless supplemented by schemes of irrigation. On the drier lands cattle-rearing is the most important occupation. Cattle are reared in *all* parts of the Sudan, but in the wetter areas agriculture is a much more important industry than the pasturing of animals. Millet is the chief grain and two crops yearly are usually grown, whilst wheat, maize and beans, cotton, indigo and kola nuts are also important crops. Cotton has long been grown by the natives, and in British Northern Nigeria attempts are being made to encourage natives to grow it for export to Lancashire. The British Cotton-growing Association has established several stations where experiments have met with encouraging results, and a beginning in exportation has been made. Kola nuts are of great value to the Sudan native. The tree produces long pods, each containing from four to six nuts, somewhat resembling chestnuts. The nuts are widely used for chewing and in making a somewhat bitter, though stimulating, drink which is largely used in the Western Sudan. In the wetter south, ground nuts, shea nut, yams, palm oil and rubber indicate the approach of equatorial forest conditions. The shea-tree bears seeds, which, like the kola nut, also resemble the chestnut. They yield a vegetable butter, which is extensively used west of Lake Chad for cooking and lighting purposes. Yams, tubers formed by the swelling of the roots of a small cultivated plant, are the native potatoes.

The only native manufactures of importance are those of leather and cotton. These are of sufficient extent to provide one of the chief reasons for the caravan trade across the Sahara. The hides are obtained from the northern pastoral areas and are manufactured in towns like Kano, which is also important as the chief native cotton manufacturing centre. The home-grown indigo is used for dyeing the cotton cloths, which find a ready sale in all parts of the Sudan.

The Sudan may be subdivided into:—

(i) The Anglo-Egyptian, or Eastern Sudan.
(ii) The Lake Chad Basin, or Central Sudan.
(iii) The Middle and Upper Niger and the Senegal and Gambia Basins, or Western Sudan.

Of these units the first has been taken in Chapter VI, owing to its close connection with the Nile, but it must be clearly borne in mind that from the standpoint of natural regions it belongs, as its name implies, to the Sudan.

THE CENTRAL SUDAN.

This part of the Sudan is the basin of Lake Chad, a shallow, marshy, fresh-water lake much studded by islands. Its area varies very much with the season, being greatest in summer, when the Sudan rains fall. The present rainfall appears to be less than the evaporation taking place, so that the lake is slowing decreasing in size. Lake Chad is the centre of a continental basin or inland drainage system, for the rivers which flow into it, the chief is the Shari, do not reach the open ocean. To the north of the sandhills, fringing its northern shores, lies a poor type of grassland producing little of importance besides gums. On its southern margins are extensive swamps and forests which give way to rich pastoral and agricultural lands where all the typical Sudan crops are raised. *Kuka,* near the western borders of the lake, is an important market town and centre of caravan routes from Tripoli and Kano. It is in Nigeria, a British possession reaching the south-western margins of Lake Chad.

WESTERN SUDAN.

This large area includes the middle and upper basins of the Niger, as well as the basins of the Senegal and Gambia rivers. The Futa Jallon highlands, on the south-western borders of Western Sudan, form the most important watershed, for in or near them rise the Senegal, the Gambia and the Niger. From these highlands the Niger flows across the Sudan for over eight hundred miles in a north-west direction, until at Timbuktu it reaches the desert margins. Then, after making a great bend, it turns south-east and enters a gorge-like valley in which its navigation is impeded by rapids or waterfalls at those points where it descends the plateau terraces on its way to the low, coastal plains. The rapids are especially dangerous above Rabba, to which point steamers can ascend from the coast. Below Rabba it receives from the east its most important tributary, the Benue. Much of the middle Niger basin forms the western part of Northern Nigeria. This valuable Sudan country is the highest and most productive part of Western Sudan. It is inhabited by tribes who long ago reached a relatively high standard of civilization. There are two principal tribes, the Hausas and the Fulas. The Hausas, who are of excellent physique, usually live settled lives and follow agricultural pursuits. They are clever craftsmen and traders, whilst they have proved their worth as native soldiers and police on many occasions. The Fulas, of mixed Hamitic and negro origin, are pastoral people. Many live amongst the Hausas, whom they conquered in the eighteenth century.

The chief towns of Northern Nigeria lie on the fertile elevated lands away from the rivers where the climate is often very unhealthy and the tset-se fly abounds. *Sokoto,* built of mud huts and surrounded by a wall about forty feet high, is the chief centre of Mohammedanism in Western Sudan. *Kano,* another ancient walled city, has for centuries been a great market and caravan centre. It is noted for its native manufactures of pottery, metal, leather and cotton. Kano-made cotton cloths, dyed blue with the juice of the native indigo, are worn not only locally but over almost the whole of North Africa. In its markets the local agricultural and pastoral products are exchanged for goods brought by caravan from the Guinea coast, and from all parts of North Africa. Kano is now in direct communication with Lagos by means of a railway which crosses the Niger above Rabba. *Timbuktu,* the fortified capital of French Sudan, is the most important town in the Upper Niger basin. It is the point upon which caravan routes from Morocco, Algeria and Tripoli converge, and is a great trading centre for desert, savannah and tropical forest products. Situated about nine miles from the Niger, it is connected with that river by a channel which is only navigable during the flood season. Timbuktu can now be reached by a rail and water route from the west coast. The Senegal is navigable in the wet season to Kayes, from whence a railway has been built to the Upper Niger, the remaining portion of the journey being accomplished by the small steamers navigating that waterway.

The Senegal and the Gambia rivers descend from the Futa Jallon highlands in a series of rapids. The Senegal passes through a poor grassland, a transitional type between desert and true savannah, whose chief product is oil, obtained from the seeds of sesame, a herb which thrives in dry regions, and from ground or pea nuts. *St. Louis,* on an island in a lagoon at the mouth of the Senegal, is the capital of French Senegal, the old colony from which French influence in the Sudan spread eastwards towards the Niger. The lagoon, which is cut off from the sea by sandbanks, is difficult to enter, especially in stormy weather, so that the port of St. Louis is being superseded by *Dakar,* sheltered by Cape Verde. Dakar is the seat of the Government General of French West African possessions.

The lower valley of the Gambia forms British Gambia, whose capital, *Bathurst,* has a good harbour on the southern bank of the Gambia estuary. The English settlement of Gambia dates from the days of Queen Elizabeth.

EXERCISES.

1. What do you understand by savannahs? Upon what climatic condition does this type of natural vegetation depend?
2. At what season will (*a*) the Algerian shotts, (*b*) Lake Chad, contain most water? Why? Both are centres of inland drainage. What is meant by this statement?
3. On the west coast of Africa are two capes, named respectively Cape Blanco and Cape Verde. Discuss the appropriateness of these names.
4. Draw a map showing the position of Timbuktu and the various methods by which it may be reached.
5. Draw sketch maps to illustrate the text given under the headings (*a*) Central Sudan, (*b*) Western Sudan (pages 67–9).

CHAPTER IX.

THE GUINEA LANDS.

THESE lands lie along the west coast of Africa from the Gambia to the Cunene. They may be subdivided into (i) Upper Guinea, from the Gambia to the Niger, and (ii) Lower Guinea, from the Niger to the Cunene.

UPPER GUINEA.

PHYSICAL FEATURES.

Upper Guinea rises from a very low, narrow, sandy coastal plain to the highlands, which act as the watershed between those rivers flowing to the Niger and those flowing to the Guinea Coast (see Fig. 15). Many of the latter rivers are navigable to the base of the highlands for small boats, but the only river of any importance for transport is the Volta. The Upper Guinea rivers suffer from the great disadvantage of discharging their waters into lagoons cut off from the sea by sandbars. These sandbars form one of the most prominent features of the Guinea Coast. The approach to them is exceedingly difficult, for a long white wall of surf is continuously thundering against them, making it extremely dangerous for ships to approach the coast. Thus it is that from Freetown to Lagos there are only one or two good landing-places, and ships have to anchor about a mile from the bars. This means that passengers and cargo must be landed in surf boats, a procedure of great inconvenience and of no inconsiderable danger. The drawback may be readily imagined when it is pointed out that all ironwork for bridges and railway construction, and all the various parts of a railway locomotive, must be carried from the steamer to the shore under these difficult circumstances.

CLIMATE.

Owing to the nearness of the region to the equator, the temperature is uniformly high at all seasons, but the range exceeds that of regions nearer the equator. The coastal belt has rain at all seasons, but further inland the fall is more restricted to the summer season. Even in the wetter coast belt there is a marked wet season in summer, and a marked relatively dry season in winter—if the terms "summer" and "winter" *can* be correctly applied to these tropical lands. The rainfall is heavier in the summer or hot season, because at that time of the year the low-pressure area over the western Sahara is exceptionally well marked. This causes the south-east trade winds, which, having crossed the equator, swerve to the right, for they are now in the northern hemisphere, to blow towards the Guinea Coast from the south-west, and to liberate much moisture on meeting the Guinea highlands. Along the coasts the south-west winds are the prevailing winds at all seasons, except for interruptions in winter, when the dry Harmattan wind

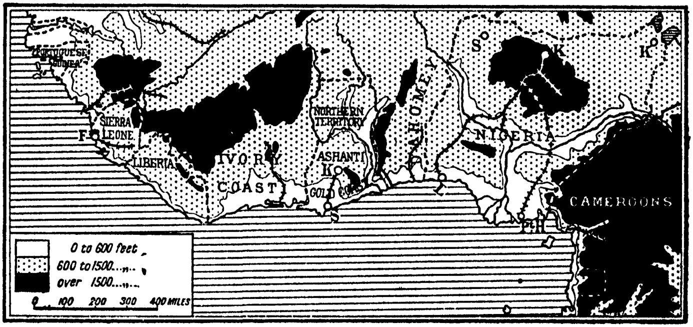

FIG. 15.—Upper Guinea.

frequently blows from the Sahara. This wind is a welcome change, and is known as the "doctor." On account of the haze produced by the particles of sand it carries, it is also often called the "smokes."

Upper Guinea is frequently spoken of as the "white man's grave," but, strictly speaking, this should be applied to Sierra Leone, although much of the low, marshy coastal plain merits this description. Perhaps, when the science of tropical medicine reaches a more advanced state, even such lands as these may be rendered quite healthy for Europeans.

NATURAL VEGETATION AND CHIEF PRODUCTS.

The Upper Guinea lowlands are typical equatorial forest. The coastal margins and the deltas of the rivers are overgrown with mangroves. Further inland, the forests are denser, and the tangled mass of trees and creepers resemble the forests of the Congo basin. When the plateau is reached, savannahs with permanent pastures are encountered, whilst still further inland are the grasslands of the rainy season only. The natural products are rubber, which is widespread; the oil palm, found chiefly in the east; ground nuts, more important in the west; cabinet woods (mahogany and ebony) and yams. Inland, important cultivated crops—cotton, maize and millet—appear. Gold, obtained both by dredging river beds and by mining, is exported from the Gold Coast, ivory from the Ivory Coast, but few spice grains are now obtained from the Grain Coast, whilst slaves are no longer captured and transported from the Slave Coast.

Transport is everywhere difficult, and products are brought to the harbourless and surf-beaten coast only with considerable difficulty, although there are now several railways running inland from ports on the coast, whilst in some places, *e.g.* the Gold Coast, good-surfaced roads have been constructed and motor traffic introduced.

The saviours of the trade on the whole Guinea Coast are the *Krumen,* who belong to a tribe indigenous to the coastal margins of Liberia. They are a well-built, energetic tribe, and are in much demand, not only as labourers, but as sailors on vessels engaged in coast traffic.

BRITISH UPPER GUINEA.

Sierra Leone.—This colony was permanently occupied by the British in 1791. At first it was used for the settlement of freed, escaped, or rescued negro slaves, hence the name of the only important town, *Freetown.* The port is built on a peninsula, and has the most sheltered harbour on the Guinea Coast, but its climate is very unhealthy. A single, narrow-gauge railway runs from Freetown to the point at which British, French and Liberian territory meet. The principal exports of Sierra Leone are palm kernels and oil, kola nuts, rubber, and ground nuts.

Gold Coast.—This colony, lying between the French Ivory Coast and Togoland, stretches for 334 miles along the coast, and includes Ashanti and the Northern Territories. The Gold Coast and southern Ashanti are forested, whilst northern Ashanti and the Northern Territories are savannahs. In the first region the chief products are cocoa, rubber, palm kernels and oil. The yield of the palm kernels and oil has decreased, owing to the greater attention which has been given in recent years to the cultivation of cocoa, now the chief product. Mahogany is floated down the rivers from the forests to the coast, and forms the most valuable timber of the region, whilst gold, obtained partly by dredging and partly by mining, ranks next to cocoa in order of value.

The Gold Coast savannahs repeat the conditions already studied in connection with the Sudan. Agriculture in the south and pastoral occupations in the north are followed. This part of the country may become important for the production of cotton; some is already grown, but the immediate need is the improvement of means of communication between the interior and the coast. There are at present two railways, one from Sekondi to Kumasi, the Ashanti capital, and another running inland from *Accra,* the capital of the colony. These railways have been supplemented by the construction of motor roads, as, for example, that from Kumasi to the Northern Territories, but despite the introduction of these modern methods of transport the communications of the colony are still inadequate. The trade of the Gold Coast is also hampered by the lack of good harbours and the drawback of the surf-beaten coast. The new artificial harbour at *Takoradi,* about five miles west of Sekondi, is expected, however, to become the chief trading port of the colony.

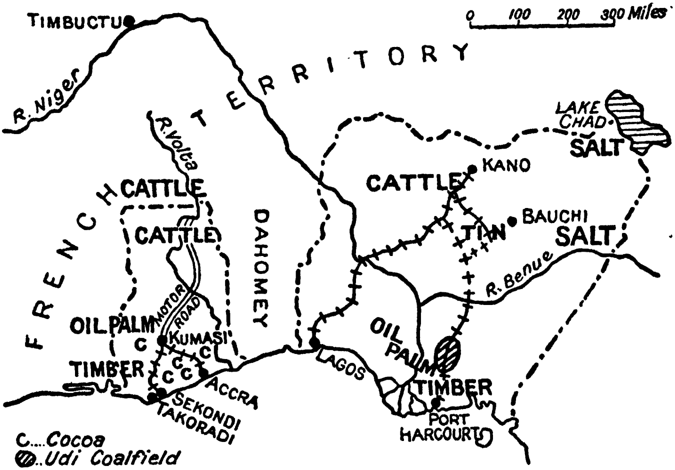

FIG. 16.—Map of Gold Coast Colony and Nigeria.

The former German Colony of Togoland, which lies to the east of the Gold Coast Colony, has been divided between British Gold Coast and French Dahomey. These European countries administer their new territory under a mandate from the League of Nations.

Nigeria.—Nigeria, the most important British West African possession, comprises a number of territories formerly under separate administrations, the most important of which were Lagos, Northern Nigeria and Southern Nigeria. To these has now been added, under a mandate from the League of Nations, a portion of the former German Colony of Kamerun. The total area is about three times the size of the British Isles, with an estimated population of twenty millions. The forested coastal plains, which in Nigeria are broader than elsewhere on the Guinea Coast, produce all the typical commodities of equatorial forest regions. The savannahs of Northern Nigeria were considered in the last chapter.

Nigeria has valuable mineral deposits which will be of greater importance in the future than they are to-day. A tin-bearing area, some 9,000 sq. miles in extent, and producing ores yielding a high percentage of metallic tin, has been located in the Bauchi plateau, south of Kano. Silver, lead, iron and coal are also found. The natives have worked lead, iron and tin for centuries. Communication with the interior is maintained by the railway from Lagos to Kano, by the great water highway of the Niger, and by a government controlled system of land transport by pack and draught animals using the many well-made roads. The important railway from *Port Harcourt,* a new port on the Bonny River, to the Udi coalfields and thence to the Benue River and along the edge of the Bauchi plateau to the Lagos-Kano railway is a most valuable trunk line. Port Harcourt is bound to become a very serious rival of Lagos. The Niger, whose swampy, very unhealthy delta stretches for 250 miles along the coast and covers an area of some 14,000 sq. miles (that is, nearly twice the size of Wales), is navigable for the shallow-draught Niger boats as far as Rabba, about 600 miles from the coast. The headquarters of the steamboats navigating the river are at *Lagos,* the chief town and port of Nigeria. The town is built on an island in a lagoon, separated from the sea by a bar. A mole has been built and a deep channel cut through the surf-beaten bar, so that large vessels can be admitted to the harbour.

The chief exports of Nigeria are palm oil and kernels, rubber, shea butter, kola and ground nuts, ivory, cotton, hides and tin.

FRENCH UPPER GUINEA.

The Sudan hinterland of the Guinea Coast is everywhere French, except in Nigeria. The French lands reach the coast in Senegal, French Guinea, the Ivory Coast, and in Dahomey. The climate and products repeat those of the other Guinea coastlands. The chief centres are *Konakri* (the capital and chief port of French Guinea), from which a railway has been built to the Upper Niger, *Grand Bassam* (Ivory Coast), and *Porto Novo* (the business centre and capital of Dahomey).

Other Upper Guinea territories are *Portuguese Guinea,* west of French Guinea, and *Liberia,* east of Sierra Leone. Both have the typical products of the Guinea Coast. The negro Liberian Republic, with a constitution modelled on that of the United States of America, had its origin in the efforts of several European and American colonization societies to make provision for the settlement of freed American slaves. The first settlement was made in 1822. Out of a total population, estimated variously at from one and a half millions to two millions, only about 12,000 are American-Liberians. The economic development of the country can scarcely be said to have begun; the country is backward and badly governed. Its capital is *Monrovia.*

LOWER GUINEA.

Lower Guinea, stretching along the west coast of Africa from the Niger to the Cunene, repeats many of the features of Upper Guinea. The coastal plains are narrow, since the edge of the plateau, which is higher in the south than in the north, comes close to the coast. In the north, where the coast turns southwards, the Kamerun volcanic group reaches, in the extinct volcano of Kamerun

Peak, an elevation of 13,000 feet. The rainfall is heavier north of the Congo than to the south, and heavier on the coastal plains and the plateau scarp than on the interior plateau. The coastal plains are thus equatorial forest, except in the south, whilst the interior plateau lands are largely savannahs. The volcanic islands, Fernando Po (Spanish), Prince's Island and St. Thomas (Portuguese), and Annobon (Spanish), continue the direction of the Kamerun highlands. Of these, St. Thomas, noted for its extensive cocoa plantations, is the most productive.

French Equatorial Africa.—This vast territory includes the French Congo, together with the greater part of the former German Colony of Kamerun, which has been placed under the care of France by mandate from the League of Nations. The interior savannah lands have been very little developed, but the coast-lands yield the same valuable products as are found in similar lands in Upper Guinea, *i.e.* palm kernels, oil, rubber, cocoa, ivory, etc. The extensive areas of volcanic soils found in Kamerun are particularly productive. Sleeping sickness is a great scourge in the more unhealthy parts, and in some districts of the old French Congo colony it appears to be fast decimating the native population. Duala and Libreville are the chief ports and commercial centres.

Rio Muni is a small Spanish tropical possession surrounded on all sides except the west by Kamerun. It has no good harbours and its rivers are inaccessible to shipping.

Portuguese Angola.—Angola, the largest Portuguese possession, whose thousand-mile coastline stretches from the Congo to the Cunene, includes the small detached Cabinda territory north of the Congo. The total area is 477,000 sq. miles, and the population about 2,600,000, most of whom live in the northern half of the colony. Angola has three natural regions. The first is that part of the north which is contained within the Congo basin, the second the high plateau of the south, and the third the coastal plain which narrows towards the south. The Congo basin region is equatorial forest, the high plateau a savannah land passing gradually into semi-desert towards the south, whilst the coastal plains and the adjacent parts of the plateau pass rapidly from equatorial forest in the north to arid desert in the centre and south. The economic development of Angola is in a very backward state.

The chief towns are on the coast. *San Paulo de Loanda* is the capital and chief port. Other important harbours are *Benguela* and *Mossamedes.* From Loanda and Benguela railways run eastwards into the interior, and as that from Benguela (actually commences at Lobita Bay) now reaches the Katanga copper-mining district of the southern Belgian Congo, not only is a new adjunct provided to the "Cape to Cairo" railway, but a very important means of developing the areas through which the new railway passes.

EXERCISES.

1. What are the difficulties of communication between the coast and the interior lands of the Gold Coast?

2. Which parts of West Africa may be expected to be important for the production of cotton in the near future? Why is Lancashire much interested in the development?

3. What is meant by the "White Man's Grave"? Discuss, in the light of modern knowledge—particularly in the science of tropical medicine—the future possibilities for the permanent settlement of Europeans in the Guinea Lands.

4. Find out what you can of the methods of government adopted by the different European countries possessing colonies on the West African coast. In particular compare the colonial policies of France and Britain.

5. Which in your opinion is the most important British possession along the Guinea Coast? Give reasons for your answer.

6. Find out all you can about the development of native-owned plantations in the Gold Coast Colony. How do the native owners dispose of their produce?

7. How did the Portuguese come to hold important territories in West Africa?

CHAPTER X.

THE CONGO BASIN.

Physical Features.

In many respects the Congo is the most remarkable of African rivers. It is 2,500 miles in length, 1,100 miles less than the Nile, but its basin is estimated to include 1,600,000 sq. miles. Over the greater part of this vast area the rainfall is heavy, so that the Congo carries more water to the sea than any other African river.

The Congo basin is a roughly circular plateau, the central part being about 1,500 feet above sea-level, and surrounded on all sides by a higher plateau (see Fig. 17). The greater part of the basin is thus a depression which not improbably represents the bed of a former inland lake or sea of vast proportions, of which Lakes Leopold II and Tumba are small remnants. It is probable that the draining of this former lake commenced when the river breached the plateau margin of the Guinea Coast and poured off the water to the Atlantic. The headstreams of the Congo are the Lualaba and the Luapula, the latter from Lake Bangweolo. Below the confluence of the Lualaba and the Luapula, the Congo receives a tributary which drains Lake Tanganyika, when the level of the water of that lake stands sufficiently high. From this point the river, here about a mile wide, is navigable to the equator, where the famous Stanley Falls impede navigation for over fifty miles. These are situated where the river leaves the eastern plateau for the lower central plateau, and form a complete barrier to water-borne traffic. The direction of the river now changes and becomes westward, and further on south-westward, until it swells out into the lake-like expansion of Stanley Pool before it plunges down the terraces of the Guinea plateau by a series of falls and rapids known as the Livingstone Falls. In the navigable 1,200 miles between Stanley Pool and Stanley Falls, the river often attains a great width, especially in the middle section, where it rather resembles an immense, long and narrow island-studded lake, whilst in other places it breaks up into many channels. The chief tributary is the Ubanghi, whose headstream, the Welle, rises very close to the Nile. Most of the left bank tributaries are collected by the Kasai, which receives the drainage of Lake Leopold II.

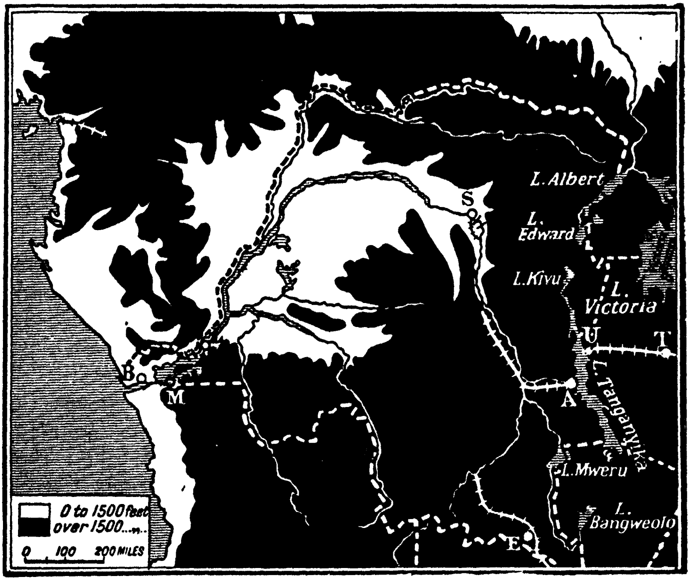

FIG. 17.—The Basin of the Congo.

CLIMATE.

Town.	Height in Feet.	Temp. of Warmest Month.	Temp. of Coolest Month.	Mean Annual Rainfall in Inches.
Leopoldville	1100	80° F. (Sept.)	76° F. (July)	55
Equatorville	1050	78 (March)	76 (July)	68
Banana	S.L.	88 (March)	78 (Nov.)	29

The climate is very equable and hot at all seasons. The rainfall is less on the coastal plains than on the plateau interior, where the mean annual rainfall over the greater part of the basin exceeds 60 inches. In most places the rain falls at all seasons, but each part of the basin has two well-marked rainy periods which coincide with or immediately follow the passage of the heat and pressure belts as they migrate with the sun. Thus, on the equator, *e.g.* at Equatorville, the wettest periods occur about the equinoxes.

NATURAL VEGETATION AND CHIEF PRODUCTS.

The heat, combined with the constantly moist atmosphere, gives hot-house conditions which result in the prevailing vegetation being equatorial forest. The Congo forests are, however, not so continuously dense as those of the Amazon basin, for there are large savannah areas, due, no doubt, to the prevailing porous sandstone, of which most of the basin is composed. These savannahs have exercised a great influence on the distribution of the elephant within the basin, for although this animal can readily make its way about the ordinary equatorial forest, it is not usually found in the very densest of forests.

The most important product of the Congo basin is rubber, obtained from many kinds of plants and trees. Rubber is spoken of as "wild" or "plantation." Although the Belgian Government has done much to encourage the careful cultivation of rubber, for plantation rubber is better than wild rubber, the actual amount obtained is not very large. There are many large areas of untouched forest, but their development must await the provision of better means of communication. Palm oil, palm kernels, copal and ivory, the latter obtained from the large herds of elephants found in the basin, are also leading products, whilst rare cabinet woods will enter more into future trade than they do at the present time, as also will cocoa, cotton, tobacco, etc. Experiments in the cultivation of the last-mentioned products are being made, and there is little doubt that the future will see the clearings of equatorial forests—both in Africa and elsewhere—producing a wide range of cultivated products. At present many of the natives cultivate bananas, yams, maize, manioc, etc.

The Congo basin has also considerable mineral wealth, especially copper and gold. Most of the mining for these minerals is carried on in the Katanga district, in the south-east of Belgian Congo. The chief centre, Elizabethville, is connected by rail with the "Cape to Cairo Railway" at Broken Hill. The outlet via Lobito Bay has already been mentioned (see p. 77).

The Katanga district is high and is thought to be suitable for white settlement, but its remoteness from suitable food supplies (brought from the Cape and from Rhodesia), and from coal and coke (obtained from the Wankie Coalfield—see p. 104), are serious drawbacks. The exact truth about the mineral riches of the region is not known, but they are known to be exceedingly great. At the present time over 100,000 natives are employed in the mines.

THE CONGO INHABITANTS.

Most of the Congo natives are negroes who speak various dialects of the Bantu group of languages. They are usually of shorter stature than the Sudan negro, and their skins are not quite so black. In the densest, and therefore least accessible, parts of the forests there are very small people known as Pygmies, whose average stature is only four feet three inches to four feet six inches. Some of the Pygmies are engaged in primitive agriculture, but many are savages obtaining the means of sustenance either by hunting with poisoned arrows or by gathering such berries or edible forest produce as grows wild. Although equatorial forest conditions do tend to debase those peoples who have to endure them, it would be wrong to suppose that all the inhabitants of the Congo basin are debased and little better than cannibals, or that they have not made any progress towards a higher type of civilization. It is natural that Congo tribes should be more backward than the negroes of the Sudan or Guinea grasslands, but most of them cannot by any means be described as savages. In the more open parts of the region there are tribes who carry on agricultural occupations, and whose codes of conduct will bear favourable comparison with those of some peoples generally reckoned to be very advanced in the scale of civilization.

The density of the population in the Congo basin is very fair, being about equal to that of the Atlas region, and far exceeding that in the Amazon basin. It varies from twenty-five to sixty-five per square mile. Formerly the population was greater, but Arab slave raids, once carried on extensively in connection with the ivory trade between the East African Coast and the Congo, did much to reduce it. The Arabs raided Congo villages in order to obtain carriers for ivory, and on reaching the coast sold the unfortunate negroes into slavery.

TRANSPORT IN THE CONGO BASIN.

The chief highway of trade is the river system itself. It has been estimated that the Congo and its tributaries have over 14,000 miles of navigable waterways. The great impediments to through navigation are the Livingstone and Stanley Falls, but these drawbacks have been somewhat counteracted by the construction of railways which have been built between Matadi, at the head of the estuary navigation, and Leopoldville on Stanley Pool, and between Stanleyville and Ponthierville above Stanley Falls. Another railway has been built from Kindu to Kongolo, near the confluence of the Lukuga, which drains Lake Tanganyika. River steamers from Kongolo reach Bukama on the Lualaba, which is now connected by rail to Elizabethville. Thus the Katanga district is in direct rail and river communication with the mouth of the Congo, but its most direct outlet is by rail via Buluwayo to Beira (see also p. 115). The journey from Boma to Elizabethville takes about sixteen days. Another important railway line has recently been completed between Albertville on Lake Tanganyika and Kabalo on the Lualaba, about fifty-five miles south of Kongolo. The only other important means of transport is the use of human porters. Excepting in the parts where the porous sandstone has resulted in a thinner type of forest or even of savannahs, and where oxen transport may be developed, it is not possible to use beasts of burden, owing to the ravages of the tset-se fly, a pest responsible not only for the lack of draught animals, but for the Congo scourge of sleeping sickness. Human transport is the most costly of all forms of carrying goods, and its enforced adoption in the Congo is one cause of the high price of the commodities obtained from that and other similar regions.

Belgian Congo.

Area=918,000 sq. miles.
Population=9,500,000, including 19,000 Whites.

A large part of the Congo basin forms the only Belgian colony. When Stanley made his great journey along the Congo, his expedition was financed by the Belgian King Leopold II. As a result, treaties were concluded, first with natives, and later with other European states, by which the area was made into a single state under the control of Leopold, who fulfilled his promise to expel the Arab slave-traders, but did not keep his pledge to keep the trade of the Congo open to all nations. In reality the Congo Free State became a great private rubber-producing estate, and horrible atrocities were committed by the agents of the rubber companies. As the result of strong public opinion the State was annexed to Belgium in 1908, and since that time atrocities have ceased. Since the Great War it has been enlarged by the addition of a piece of territory in the north-western part of the former German Colony of East Africa.

The capital is *Leopoldville,* on Stanley Pool, and the chief ports are Banana, Boma and Matadi. In the interior we have already noted the towns of Stanleyville and Elizabethville.

EXERCISES.

1. Draw an outline map of Europe and on it trace the Congo and its tributaries, care being taken that both are drawn to a common scale.
2. Compare the basins of the Amazon and Congo rivers in as many respects as you can.
3. Describe the forests of the Congo basin, with special reference to their effect upon the peoples living within them.
4. How may a journey from Boma to Elizabethville be accomplished in the shortest time? Draw a map to illustrate the route taken. By what other means may Elizabethville be reached? Indicate these on the map.
5. It has been stated that a desert with occasional oases is of greater value than an equatorial forest. Discuss this with special reference to the Congo Basin and the Sahara.
6. Equatorial forests have been called "Lands of Debilitation." Discuss the appropriateness of this title.
7. In what ways have the mining developments in the Katanga area affected the life of the natives?
8. Draw a sketch map to show the position of the Katanga mining area and its communications with the world outside.

CHAPTER XI.

THE PLATEAU OF THE GREAT LAKES.

PHYSICAL FEATURES AND CLIMATE.

THE Plateau of the Great Lakes, or the Plateau of East Africa, lies south of Abyssinia and Somaliland and north of the Zambezi. It is a portion of the high plateau belt, stretching in a south-west to north-easterly direction from south-west Africa to the Red Sea. The average elevation is from three to four thousand feet, but there are extensive areas of much greater altitude. The tableland consists largely of great sheets of old, very hard, crystalline rocks, through which volcanic materials have been forced, so that there are extensive sheets of lava above which tower a lofty but extinct series of volcanoes with peaks attaining an altitude of 14,000 feet in Mount Elgon, 17,000 feet in Mount Kenya, and 19,300 feet in Kilimanjaro. These volcanoes lie along the margins of the more easterly of the great rift valleys which form a notable feature of the East African plateau (see Figs. 2 and 18). It should be carefully noted that Lakes Victoria, Mweru and Bangweolo are not rift valley lakes, but occupy depressions in the general level of the plateau. The great snow-capped mountain mass of Ruwenzori (16,800 feet), which is not believed to be of volcanic origin, lies between Lakes Albert and Albert Edward. Between Lakes Albert Edward and Kivu the western rift valley is blocked by the active volcanoes of the Mfumbiro group.

On the east the plateau descends by steep terraced escarpments to a low, unhealthy coastal plain, varying in width from a few miles at Mombasa in the centre, to about one hundred and fifty miles near the mouth of the Jub in the north. On the west the plateau descends from the highlands of the western rift valley to the lower plateau of the Congo basin.

The temperature on the plateau may be described as very warm at all seasons. On the coastal plains it is hot at all seasons. This equable distribution of temperature is in both cases due to nearness to the equator, whilst the higher temperature on the plains is due to the lower altitude. As regards rainfall, the plains have a

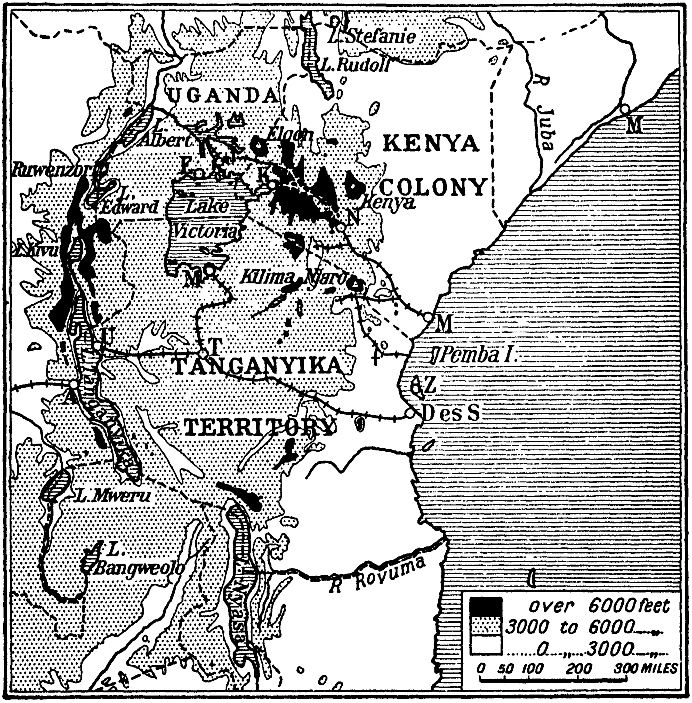

FIG. 18.—The Plateau of the Great Lakes.

much heavier rainfall than the plateau, and there is a marked increase in the amount as one goes from north to south. The coastal plains receive rains at all seasons, but most falls in summer. This seasonal distribution of rainfall is also true of the Lake Victoria region. Between these two regions the rainfall occurs almost entirely in summer, winter and spring being exceedingly dry.

NATURAL VEGETATION AND CHIEF PRODUCTS.

These climatic conditions produce two main types of vegetation, the equatorial forests of the coastal margins and the wetter rift valley areas, and the savannahs of the plateau. In the drier, eastern parts of the plateau, the prevailing landscape often assumes that of a scrubland, consisting of stretches of poor grassland with patches of thorny, gum-yielding bushes and trees. On the hot, unhealthy coastal plains, which may be compared with those in similar latitudes on the west coast, tropical products such as rubber, rice, yams, bananas, spices, sisal hemp, etc., are cultivated. The coast is often fringed with mangrove swamps, whilst coconut palms are very common. The bark of the mangrove is utilized in tanning, and the dried kernel of the coconut, known as copra, is made into soap and candles. One interesting feature of the tropical East African coast is the presence of coral islands and reefs. These are absent from the west coast. The coral polyp cannot live unless the mean annual temperature of the water reaches 70° F., and on the east coast, where the winds and ocean currents are on-shore, this temperature is attained, but the off-shore winds and cooler currents of the west coast give lower temperatures, which prevent coral growth. This distribution of coral holds good in Australia and America.

On the plateau, settlement is confined chiefly to the uplands, for the lower scrub regions are not suitable, owing to the infertility of the crystalline rocks, to the dryness, and to the presence of animal pests such as the tset-se fly. But these scrublands are great big-game hunting-grounds, and, in some areas, antelopes, zebras, lions and rhinoceroses are common. On the uplands the volcanic soils are exceedingly fertile and rich pasture-lands are found, whilst the best parts are utilized for agricultural purposes. The Masai, a fine, stalwart race of mixed Hamitic (white) and negro blood, are the aristocracy of the native inhabitants. They are pastoral nomads, who rear cattle, goats and sheep, whose chief foods are milk and meat. Formerly they raided the more settled agricultural communities of the wetter uplands. In the latter districts, cotton, tea, coffee, sisal, maize and other crops are now being cultivated under the supervision of Europeans. In the Lake Victoria area the banana grows profusely and forms the chief article of food, whilst the tree itself is put to a great variety of uses by the natives. The same is true of the coconut palm on the coastlands.

THE POLITICAL UNITS OF EAST AFRICA.

KENYA COLONY AND UGANDA.

Kenya Colony: Area=225,100 sq. miles.
Population in 1932=3,100,000, including 17,000 Europeans, 38,000 Indians and 11,750 Arabs.
Uganda Protectorate: Area=94,204 sq. miles.
Population in 1932=3,600,000, including 1,800 Europeans and 14,000 Indians.

These British possessions include the two natural regions already noted, the equatorial lowlands of the coastal plain, and the scrub and savannah lands of the plateau. It will be seen that in a country whose elevations range from sea-level to snow-clad mountains there are bound to be many local varieties of climate and vegetation.

Perhaps the most important economic question affecting British East Africa is that although the land lies so near to the equator it has large areas where, on account of the altitude, the temperature is so reduced that European settlers have made their homes there and are making efforts to establish a permanent white colony. Most of these colonists are found in Kenya in the highlands lying astride the rift valley. It should be noticed that the white settlers are entirely dependent upon native labour and that sufficient time has not yet elapsed to make a pronouncement as to whether or not these tropical highlands are "white men's lands." They are certainly not white men's lands in the same sense as Canada and Australia are.

The leading exports are cotton (mostly from Uganda), maize, wheat, coffee, sisal, coconuts and copra, sugar, hides and skins, including goatskins. There should be no difficulty in allocating these articles to the particular parts of the country in which each is produced. Wheat, coffee and sisal are mainly produced on European-owned farms. The other articles are produced by natives as well as by Europeans.

The chief means of communication is the Kenya and Uganda Railway, which runs from *Mombasa,* the most important town and port of Kenya Colony, to *Kisumu* on Lake Victoria. Mombasa, whose harbour is one of the best on the East African coast, is on a coral island connected to the mainland by a bridge. The railway has to surmount very steep gradients, not only in attaining the level of the plateau, but in surmounting the steep scarps of the eastern rift valley. Just before reaching the higher parts of the plateau, the line passes through *Nairobi,* the administrative centre of Kenya. On Lake Victoria regular steamship services are maintained, the most important being that between Kisumu and *Entebbe,* the administrative centre of Uganda. Now that the Kenya railways have been extended westwards into Uganda, however, the lake steamship services have declined in importance. Communications between Uganda and the Nile are being improved, but at present these are confined to a motor road which reaches the navigable Nile at Mongalla.

Formerly the islands on Lake Victoria were populated, but they have been deserted, owing to the terrible scourge, sleeping sickness, which has also been responsible for the depopulation of whole areas in Uganda.

One interesting feature of Kenya is worth noting. The visitor is struck by the links which the country has with India. He notices that Indians drive the trains and most of the station-masters are Indians. He sees Indian workmen engaged in most of the skilled trades, and numerous Indian traders and shopkeepers, while in Mombasa harbour he notices that many merchant ships arrive from, or depart for, Indian ports. In modern times Indians were introduced to work on the building of the railways, but it is very probable that one of the world's earliest sea-trading routes was between East Africa and India. From May to October, the season of the south-west monsoon, the winds blow from Africa to India, whilst from November to April, the steady north-east trades blow in the opposite direction. These alternate winds helped sailing ships long ago, and even to-day considerable trade is done by sailing ships which leave Indian and Persian Gulf ports towards the end of each year for Mombasa, Zanzibar, etc., and return as soon as the summer monsoons set in (see also p. 28).

TANGANYIKA TERRITORY.

Area=373,500 sq. miles.
Population in 1932=5,000,000 (8,200 Europeans).

The relief, climate, vegetation and natural regions of this country resemble those of Kenya Colony. The principal plantation products of the tropical coastal plains are coconuts, rubber, cocoa, sugar, tea and coffee. The successful development of the plantations is largely due to the work of experimental stations established by the German Government during the time the country was a German colony. It is now ruled by Britain under a mandate from the League of Nations.

The capital and chief port is *Dar-es-Salaam,* situated at a gap in the coral reef which fringes the coast. From this port a railway runs via *Tabora* to *Kigoma,* near to *Ujiji,* on the shores of Lake Tanganyika. This line carries eastward the products of the different belts through which it passes, as well as those of eastern Belgian Congo. It has superseded the extensive caravan trade which formerly followed its route. An important feeder of this railway joins Tabora to Mwanza on the southern shores of Lake Victoria (see Fig. 18). Another railway runs from Tanga, on the coast opposite the island of Pemba, through rich plantations to a point south of Mount Kilimanjaro. It then runs eastwards and makes a junction with the Kenya Railway.

THE ZANZIBAR PROTECTORATE.

Area=1,020 sq. miles.
Population in 1931=235,000 (280 Europeans).

This British Protectorate includes the islands of Zanzibar and Pemba, both of coral formation. Historically, Zanzibar is of considerable interest, for, as a centre of Arab power, it dominated the trade of East Africa for very many years. It was the chief starting-point for the caravan trade between the coast and Lake Tanganyika and the Congo. It has the great advantage of being a very fertile and healthy island, facing a most unhealthy coast. In modern times its importance and its population have declined, largely owing to the rivalry of Mombasa and Dar-es-Salaam, both of which have now modern means of communicating with the interior. It has still a great entrepôt trade, as is shown by the fact that cotton cloth, sugar, ivory, provisions and petroleum figure both as important exports and imports. The chief products of the islands of Zanzibar and Pemba are cloves, the flower-buds of a tree, and copra. The bulk of the world's supply of cloves is exported from these two islands. The port of Zanzibar is built on the west coast, facing the mainland.

NORTHERN RHODESIA AND THE NYASALAND PROTECTORATE.

Northern Rhodesia: Area=288,000 sq. miles.
Population in 1932=1,400,000 (10,000 Europeans).
Nyasaland: Area=37,890 sq. miles.
Population in 1932=1,600,000 (1,900 Europeans).

These British possessions occupy the southern portion of the Great Lakes Plateau. Their climate, with its small annual range of temperature and its well-marked summer rains, produces typical savannah grasslands, interrupted by thin forest areas, but there are areas of dense tropical forest in the wetter parts. The lowlands, *i.e.* the river valleys, are unhealthy and infested by the tset-se fly, and are therefore scantily peopled, but they are commercially important on account of the ivory obtained from the elephants which live there. The rhinoceros and hippopotamus are also found along the banks of the Zambezi and other rivers. The higher parts of the plateau, *e.g.* the Shiré highlands, are free from the tset-se fly and rinderpest, and on account of their elevation enjoy a healthy climate. It is, therefore, in these areas that most of the people live. It is still uncertain whether these upland areas can be permanently colonized by Europeans, but British settlements, largely Scotch, have existed in the Nyasaland uplands for many years.

At the present time the planters are engaged in growing tobacco, cotton, coffee, rubber and tea, while the natives grow maize, millet and cotton. The natives also follow pastoral occupations and rear cattle, sheep and goats. Their cattle and maize find a ready market in the mining areas.

Northern Rhodesia is extremely rich in minerals. *Broken Hill* is the principal mining centre at present, but mining operations are being actively carried on in the area adjacent to the Belgian Congo, where continuations of the rich Katanga copper deposits are found. At Broken Hill the chief minerals are lead and zinc.

Northern Rhodesia and Nyasaland, in common with the whole of British Central Africa, suffer from the disadvantage of having no outlet to the sea in British territory, except towards the south. Northern Rhodesia is brought in contact with Southern Rhodesia and British South Africa by the so-called "Cape to Cairo" Railway, whose present terminus may be considered as Broken Hill, from which a branch line runs north-eastwards into Belgian Congo. It has also rail connections to Beira via Bulawayo and Salisbury. The natural outlet of Nyasaland is along the Shiré river to the Zambezi, but unfortunately the Shiré is only navigable during the wet season, whilst it is silted to such an extent that its value is further diminished. *Blantyre* is connected to Beira by a railway which will eventually reach Fort Johnson at the southern end of Lake Nyasa. Notice carefully the importance of the Portuguese port of Beira to Nyasaland and the two Rhodesias, and also the value to Northern Rhodesia of the proposed line from Kafue to Sinoia.

Excellent roads have been constructed in many directions, the most famous being the Stevenson Road, named after its originator, which runs from Karonga, near the head of Lake Nyasa, to the southern end of Lake Tanganyika. On both these large lakes there is also a regular service of steamers.

The present administrative centre of Northern Rhodesia is *Livingstone,* situated five miles north of the Victoria Falls in the extreme south of the country, hence the agitation for a new capital in a more central position. Other centres are Fort Jameson, east of the middle Loangwa river, and Abercorn and Fife on the Stevenson Road. *Zomba* is the administrative centre of Nyasaland, but *Blantyre* is the most important settlement. Situated in the Shiré highlands, it is healthy and is in the midst of valuable coffee, tobacco and rubber plantations. The Shiré highlands are believed to be rich in gold, silver, copper, iron and coal, but at present little is mined.

NORTHERN MOZAMBIQUE OR PORTUGUESE EAST AFRICA.

That part of Portuguese East Africa lying north of the Zambezi and south of the Rovuma repeats the two physical units of the regions already studied, but with certain important modifications. The coastal plains are much broader, and the plateau is, on the whole, lower. Indeed as regards the plateau, the real plateau level is not reached until the eastern margins of Lake Nyasa are approached. The climate is that of a hot monsoon type; the summers are hotter than in the equatorial lands, and the winters rather cooler, whilst the rainfall is chiefly confined to the summer season. The mean annual rainfall on the coastal plain is about 40 inches, which is less than falls on the equatorial coasts farther north. This is partly due to the fact that the region lies to the lee of Madagascar. In the highland area bordering the eastern margins of Lake Nyasa the rainfall is heavier, so that the rivers rising there are of more value than those rising nearer the coast, since the latter dry up in the dry season.

The natural vegetation and products resemble those of East Africa, although the forests of the coastal belt are not so dense, but the development of the natural resources of the country has been exceedingly slow.

The chief port is *Mozambique,* built on a coral island situated about three miles from the coast at the narrowest part of the Mozambique Channel. It is an important centre for trade, a large part of the exports from the smaller harbours along the coast being assembled there. Sugar, maize, cotton, ivory and ores are the chief exports.

EXERCISES.

1. Draw an east and west section, so as to bring out the typical physical features of the East African plateau.
2. Coral is found on the coast of tropical East Africa, but not on the west coast. Why is this? Are similar conditions found in other continents?
3. What is a rift valley? Give an account of the Great Rift Valleys of East Africa.
4. Write a short essay on one of the following subjects: (*a*) The railways of British East Africa; (*b*) the suitability of East Africa for the settlement of Europeans.
5. Find out particulars of the great bridge now in process of erection (1934) across the Zambezi. How will it help communications in Nyasaland, and between Nyasaland and Beira?

CHAPTER XII.

SOUTH AFRICA.

I.—GENERAL PHYSICAL CONDITIONS.

PHYSICAL FEATURES.

AFRICA south of the Zambezi consists of high plateaus built up of nearly horizontal layers of rock. It is, on the whole, the highest part of the continent. Except in Portuguese East Africa the coastal plains are everywhere very narrow, whilst the only portions of the plateau which are under 3,000 feet above sea-level are the valleys of the Zambezi, the Limpopo, and the Lower Orange and its tributary the Molopo (see Fig. 19). There are three

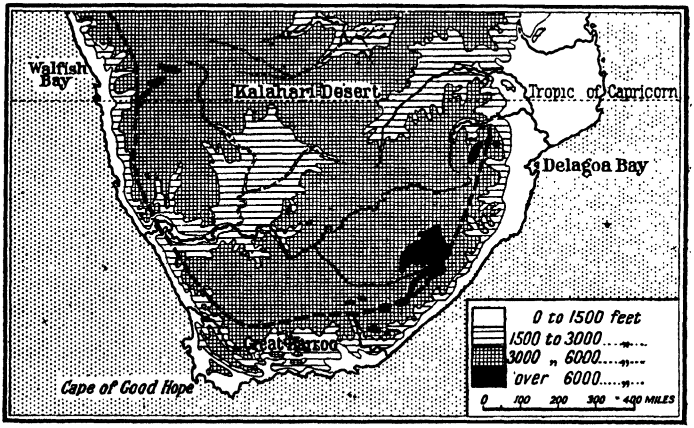

FIG. 19.—Physical map of South Africa.

well-marked plateau regions where the elevation is between 4,000 and 6,000 feet. The first, known as the Damara-Nama Plateau, lies along the west coast, north of the Orange River; the second is the High Veld, which stretches south-westwards from the Limpopo; and the third is between the Limpopo and the Zambezi, and constitutes part of Southern Rhodesia. In the extreme south-west (see Fig. 1) there are highlands which do not form part of the plateau. They are ancient folded ranges running in an east and west direction parallel to the edges of the plateau. They are much older than the folded Atlas ranges of North-West Africa, and appear to have been worn down to a peneplain and afterwards to have undergone uplift, so that the softer rocks have been worn away, leaving the hard rocks standing as ridges, of which the Zwarte Bergen and Lange Bergen are examples (see Fig. 22).

The plateau descends to the coastal plains by a series of well-marked terraces. Looked at from below, the edges of the terraces look like mountains, but from above the edges are approached by gentle slopes. The highest forms what may be called the rim of the plateau (see Fig. 20), and it is characteristic of South Africa that this rim stands higher than the general plateau level. Thus the Drakensberg and the Nieuwveld Mountains are really parts of the edges of the high plateau. In the south the plateau descends to the sea by two well-marked terraces. Between the Nieuwveld Mountains and the Zwarte Bergen is the plateau of the Great Karroo, whose elevation is from two to three thousand feet, and between the Zwarte Bergen and the Lange Bergen, the lower Little Karroo (see Figs. 20 and 22).

The plateau configuration of the greater part of South Africa accounts for the large number of flat-topped or pointed prominences known as *kopjes,* which are plateau remnants comparable with the mesas and buttes of Western United States. There is a marked difference between the scenery of the eastern margins, where the rainfall is sufficient to produce the typical rounded mountains and hills associated with water erosion, and the west, where, owing to lack of water, the wind is the chief agent of erosion and produces the typical desert outlines.

CLIMATE.

The northern portion of South Africa is within the Tropics, and no part lies farther than 35° from the equator, but since the greater portion of the area is high plateau, temperature is almost everywhere modified by altitude. January is the hottest month, owing to the apparent southerly migration of the sun during the southern summer, and July is the coolest. This means that low-pressure conditions will prevail over the plateau in January and high-pressure conditions in July. The greater part of South Africa lies in the track of the south-east trades at all seasons. In summer the whole area receives these winds, for the southerly migration of the pressure belts causes the westerlies to blow south of the continent. Since it is also in summer that low-pressure conditions prevail over the interior plateau, it is during this season that the inflowing south-east trades not only bring most rain to the east coast, but also penetrate beyond the rim of the plateau, and bring rain to the plateau itself. But, of course, the amount of rain diminishes as the west coast is approached, with the result that except in the higher parts of the plateau, the west

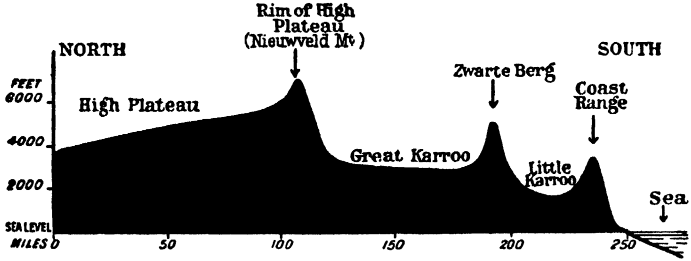

FIG. 20.—Diagrammatic section from the Orange River to Mossel Bay.

coast is so dry that desert conditions prevail, for the south-east trades cannot bring winter rains, except to the east coast margins. They are unable to do this, because in winter the air moves outwards from over the cooled plateau and prevents the trade winds from crossing the rim of the plateau. Therefore the winter rains brought to the east coast by the south-east trades are confined to the coastal margins. But the south-west corner, the Cape Town region, receives winter rain from the westerlies, which at this season blow farther north owing to the migration of the heat and pressure belts into the northern hemisphere.

The coastal belt north of the Orange River is exceedingly dry, and little rain falls, apart from that brought by occasional thunderstorms. It is a lee coast along which the prevailing winds blow more or less parallel to the trend of the coastline. The low temperatures along this coast (see figures for Walfish Bay on p. 14) are accounted for by the presence of the cold Benguela current.

Although on the whole the greater part of South Africa is very dry, it is much better watered than the trade-wind belt of North Africa. The reasons for this are: (i) the greater elevation and narrowing of the continent; (ii) the presence of a large ocean to the east, instead of, as in North Africa, the land mass of south-west Asia, so that the winds pass over ocean waters before encountering the land. It is for these reasons that the Kalahari desert is restricted to the west coast, whilst the Sahara stretches right across the continent.

South African Rivers.

The three chief rivers of South Africa are the Zambezi, the Orange, and the Limpopo. The *Zambezi* headstreams are separated from the Congo basin by a swampy divide. Its chief tributaries are the Loangwa and the Shiré, both of which are from the wetter north bank. The Shiré drains Lake Nyasa. It is very probable that the

Zambezi basin once had a heavier rainfall, and that the Kubango River which now loses itself in the shallow Lake Ngami and the Makarikari Salt Pans, formerly reached the Zambezi. Excepting near its source and along the plains in the lower courses of the river, the Zambezi, like the Niger, flows across a typical savannah region. The Zambezi and the Shiré offer the best means of approaching the interior from the coast, but unfortunately both are handicapped by falls and rapids, round which, as in the case of the Congo, roads and railways have been or are being made in order to surmount the difficulty the impediments present. The famous *Victoria Falls* occur where the Zambezi in its middle course crosses a sheet of basalt rock. In this very hard rock the river has cut a zigzag gorge some forty miles long, into the head of which the river, there a mile wide but not very deep, falls from a height of about 360 feet. Thus the falls cannot be seen until the brink of the chasm is reached.

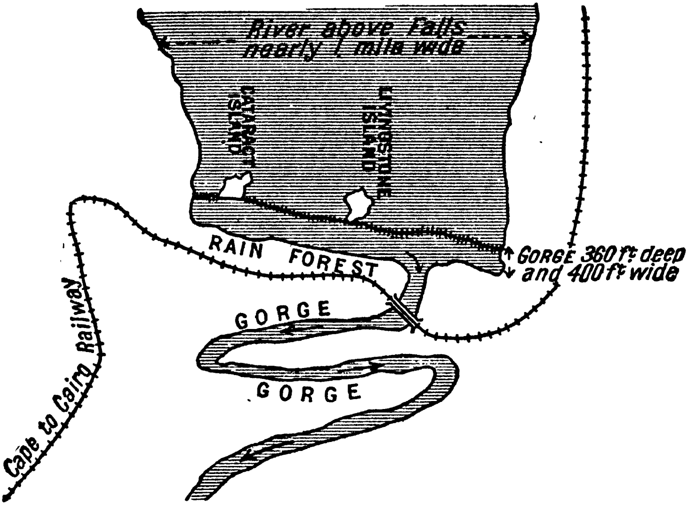

FIG. 21.—Victoria Falls.

for the river falls, as it were, into a deep hole in the ground. The "Cape to Cairo" Railway crosses the gorge by a bridge about one-eighth of a mile in length (see Fig. 21). Between the Victoria Falls and the coastal plains the river has many falls and rapids, the best known being the Kebrabasa Falls, 400 miles from the mouth. Of the many distributaries the most accessible to steamers is the Chinde, on which stands the town of the same name (see p. 94). The *Orange*, as well as its chief tributary the Vaal, rises in the wet Drakensberg Mountains in the Mont aux Sources, and then flows across the plateau towards the drier west. During the wet season or after storms, the Orange is a raging torrent, but in the dry season it carries very little water to the sea, whilst many of its tributaries, *e.g.* the Molopo, are then dried up. In common with other rivers flowing across dry plateaus, it has cut a deep, gorge-like valley, which hinders rather than helps communication, whilst the water cannot be used for irrigation schemes without the installation of expensive machinery to raise it to the plateau surface. The *Limpopo* carries still less water to the sea, for it rises in the Witwatersrand, an interior ridge. In the dry season there is little or no continuous flow of water, and the river is simply a long string of crocodile-infested pools occupying the deeper parts of the bed.

NATURAL VEGETATION.

The various types of natural vegetation and vegetable products in Africa south of the Zambezi are closely related to the climatic conditions. It is only in the distribution of the mineral wealth that we see no connections with present climatic conditions. The chief forested regions are in the east and south-east, where, in the coastal lowlands of Portuguese East Africa and in Natal, the heavy summer rainfall is sufficient for the growth of trees which are of a tropical character in the north and of a warm temperate type in the south. There are also trees of the Mediterranean evergreen type in the south-west, where most rain falls in winter. Proceeding from east to west, the eastern parts of the high plateau have sufficient summer rain for the growth of grasses but not for tree growth. Thus, in the middle Zambezi and Limpopo basins the prevailing vegetation is savannah, whilst farther south the increased elevation and greater distance from the equator cause the grasslands or veld to be of a temperate type. Farther west, the middle and lower Orange basin, the eastern parts of South-west Africa and Bechuanaland form a transition semi-desert area, which gradually merges into true desert as the coastal margins are approached (see Fig. 7).

It will thus be inferred that agriculture is restricted mainly to the east and south-west, and to the river valleys and wetter parts of the grasslands; that the best pastoral lands are in the eastern and southern parts of the plateau, and that the western lands are of comparatively little value either for agriculture or pasturage.

The Mineral Wealth of South Africa.

The mineral wealth of South Africa is not only very great, it has profoundly affected the history and development of that part of the continent. In many places it is only partially developed, owing to the lack of railways and the difficulty of obtaining labour. *Diamonds* were discovered at Kimberley in the 'sixties, and the Kimberley mines, owned by the famous De Beers Company, are still the most famous. The stones are found in a kind of blue clay, which is dug out of cavities roughly circular at the ground level, but tapering to a point beneath the surface. This appears to suggest that they were formerly the craters of volcanoes. There are also valuable mines (the Premier Diamond Mines) near Pretoria. In the last few years the big mines have been hard hit by the finding of diamonds in alluvial deposits. The chief "diggings" are in the South-west Transvaal between Mafeking and Johannesburg; in the neighbourhood of the confluence of the Orange and the Vaal; and at places along the coast of South-west Africa from Walfish Bay to Port Nolloth. The alluvial deposits are worked by diggers working on their own account.

Over one-third of the world's annual output of *gold* comes from the Witwatersrand (= White Water's Ridge) of the Transvaal. The Witwatersrand, shortly "The Rand," is an east-and-west ridge of hard quartz conglomerate rock, which forms the divide between the Limpopo and the Vaal. The gold, which is found in small grains throughout the rock, can only be obtained by the use of most complicated and expensive mechanical and chemical processes. The chief town engaged in this industry is Johannesburg, the largest town in South Africa. Both in the diamond and in the gold mines natives form the bulk of the labourers, and outnumber the whites by ten to one. The natives are usually recruited for a fixed period, and during their stay at the mines they live in compounds, or enclosures, within the mine limits, and are fed and clothed by the mining companies. At the end of their term of service they are free to depart or to re-engage for another period. Other important gold-mining areas are at Barberton, east of Pretoria, and in Southern Rhodesia, in the district traversed by the railway between Bulawayo and Salisbury. Gold has been worked in and exported from the latter district for many centuries.

Copper is mined at Ookiep, which lies in a semi-desert region in the north-west corner of the Cape of Good Hope. Its port is Port Nolloth. Copper is also mined in South-west Africa.

Coal of good quality is mined in sufficient quantities to supply the demands of South Africa, and to provide a surplus (about half of the output) for export. In some parts, however, wood is still used for fuel on railways and in the mines. The chief mining region lies east of Pretoria, in the vicinity of Middelburg. The second important coal-producing area is in the Drakensbergs. Here the chief mining centres are Dundee and Newcastle. From Durban great quantities of coal are exported to the ports along the borders of the Indian Ocean. Another valuable coal-producing district is at Wankie, which is on the railway some fifty miles south-east of the Victoria Falls.

Other South African minerals include silver, salt, tin, chrome iron ore, iron and asbestos, but they are not at present as important as those mentioned above. Chrome iron ore and asbestos are, however, very important in Southern Rhodesia.

EXERCISES.

1. Using your atlas draw a characteristic section (*e.g.* from Mossel Bay to the Orange River), bringing out the main features of the descent from the High Plateau of South Africa to the coastal plain. Compare it with Fig. 20. Can you account for the peculiar succession of bay-like indentations of the south-east coast of Southern Africa?

2. Why does most of South Africa experience summer rains? Which part has most rain at another season? Why? Why does the amount of rainfall decrease from east to west? How does the decreasing rainfall affect natural vegetation?

3. Why is it that gold-mining areas do not support such a dense population as most coal-mining areas? Where are the chief gold-mines in South Africa?

4. Compare Africa south of the Zambezi with Australia as regards (*a*) relief and structure, (*b*) the distribution of temperature, rainfall and natural vegetation, (*c*) natural regions.

5. What are the following, how are they obtained and what use is made of them: chrome ore, asbestos, diamonds?

CHAPTER XIII.

SOUTH AFRICA.

II.—POLITICAL AND ECONOMIC GEOGRAPHY.

THE UNION OF SOUTH AFRICA.

Total Area=473,000 sq. miles.
Total Estimated Population in 1933=8,370,000 (1,890,000 Whites).

THE union of Cape Colony (now Cape of Good Hope), Natal, Transvaal and Orange Free State was completed in 1910 and has already accomplished a great deal towards the unification of territories which formerly were developing separately. In particular the placing of the railways under the control of the central government has led to a marked improvement in railway transport.

THE CAPE OF GOOD HOPE.[1]

Area=277,000 sq. miles.
Population=2,783,000 (650,000 Whites).

The province has the following natural regions:—

(*a*) A "Mediterranean" region in the south-west.
(*b*) An eastern warm temperate region in the S.E.
(*c*) The Karroos, forming the steps to the High Veld.
(*d*) A High Veld region in the north-east.
(*e*) A semi-desert region in the north-west.

Most of the people live in the first two regions, and least in the last. The Cape Province leads the other states of the Union in the production of wheat, wool, citrus fruits, wine and diamonds. The diamonds chiefly come from Kimberley; it should be easy to allocate the other articles to the areas in which they are chiefly produced. The province is also noted for the rearing of cattle and goats, for its tobacco plantations and its ostrich feathers, although the last-named is now comparatively unimportant owing to the fact that ostrich feathers are no longer fashionable.

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[1] There has been no census of natives since 1921, so that the statistics for the separate states are for that year. Nor are details available of the figures given for the 1933 estimate (see above) for the Union as a whole.

The most beautiful part of the Province is the Cape Peninsula, at whose southern extremity lies the Cape of Good Hope. It is a wonderful playground of mountains and valleys, bays and headlands, and is a veritable paradise for those who love wild flowers, while some of its beaches offer ideal conditions for surf bathing. Many popular summer holiday resorts are found there.

The chief town of the province is *Cape Town*, situated on Table Bay in the extreme north of the Cape Peninsula. It owes its great importance as a port to the fact that it is a half-way house near the southern extremity of a land which has to be rounded by those vessels using the Cape Route and trading between the North Atlantic ports on the one hand, and those of India, the Far East and Australasia on the other. As a port it has greatly increased in importance owing to the improved means of communication with the interior. Its immediate hinterland is the fruit and wine-producing region and the pastoral Karroos, but the railways have extended the hinterland so much that it exports the gold of Johannesburg, the diamonds of Kimberley, and many of the commodities of far-distant Southern Rhodesia (see Fig. 23). Cape Town is also an important centre for fishing and whaling vessels. In summer the town is sheltered from the south-east trades by Table Mountain, which forms an imposing background for the town, but in winter the strong westerly winds blow into the bay with such vigour that a breakwater has been constructed to protect the harbour. On False Bay, behind Table Mountain, but connected with Cape Town by tramway, stands *Simonstown,* a naval station of considerable strategic importance.

Other ports are *Port Elizabeth* and *East London.* The former stands on Algoa Bay, a fairly good harbour, but unfortunately exposed to the full force of summer, south-east gales. Its hinterland comprises the eastern Great and Little Karroos, with both of which it is in communication by rail, as well as with the High Veld and Cape Town. From the nature of the regions it serves, it follows that its chief trade is in wool, hides and skins and mohair. East London has a rather poor harbour, made by the dredging of the mouth of the small Buffalo River. The nature of its trade resembles that of Port Elizabeth. Both ports have connection with the Cape Railway at De Aar Junction (see Fig. 23). *Port Nolloth,* south of the mouth of the Orange, exports the copper mined in the Ookiep area.

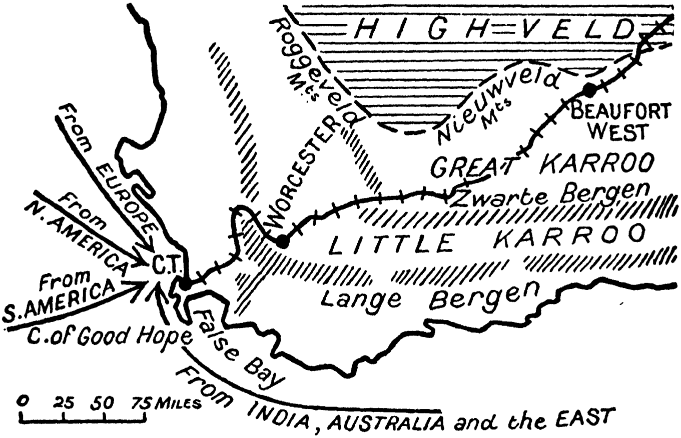


FIG. 22.—Map of South-west Corner of Africa.

Of the interior towns *Graaff Reinet,* a great wool-collecting centre, in the eastern part of the Great Karroo; *Kimberley,* the centre of the great diamond-mining area lying between the Vaal and its tributary the Modder; and Worcester, Paarl and Stellenbosch—agricultural and fruit-growing centres in the "Mediterranean" area—are the chief.

Note the *Transkei Territories* which lie between the Kei and Natal. Some whites live in this area, but in the main it is a native reserve where special laws operate and the natives enjoy a measure of self-government. The native population is at present nearly one million, and is increasing; there are only 14,000 whites. The Transkei contains some of the best lands in the province, and the natives are chiefly engaged in rearing cattle and sheep and in growing maize.

NATAL.

Area=35,000 sq. miles (including Zululand).

Population=1,429,000 {
137,000 Whites.
200,000 Indians and other Asiatics.
1,092,000 Natives.

Natal has the typical climate of eastern margins in warm temperate lands. It may thus be compared with the coastal margins of New South Wales. Owing to the nearness of the rim of the plateau to the coast, and to the fact that in Natal, as elsewhere in South Africa, the coast is reached by a series of plateau steps, elevation produces differences of climate, and therefore differences in products and occupations, even within the borders of a small state. Natal may be divided into—

(*a*) The hot coastal plain.
(*b*) A middle agricultural belt.
(*c*) The highlands of the Drakensbergs.

The coastal belt produces sugar, sub-tropical fruits, such as bananas and pineapples, and tea. The tea is grown on the hills near the coast. It is here that we find large numbers of Indians. They were introduced as being more satisfactory for plantation work than the native Africans, and are largely employed in the cultivation of the products just mentioned. Formerly these Indian workmen come in on agreement to serve their masters for a term of five years, at the expiration of which they were free, either to return or, as many have done, to take up farms for themselves. The Indian Government has, however, prohibited this method of labour recruiting.

In the middle belt, which includes the terraces between the coastal plain and the Drakensbergs, farming of a different type is carried on. Many cattle and sheep are reared and much wool is exported.

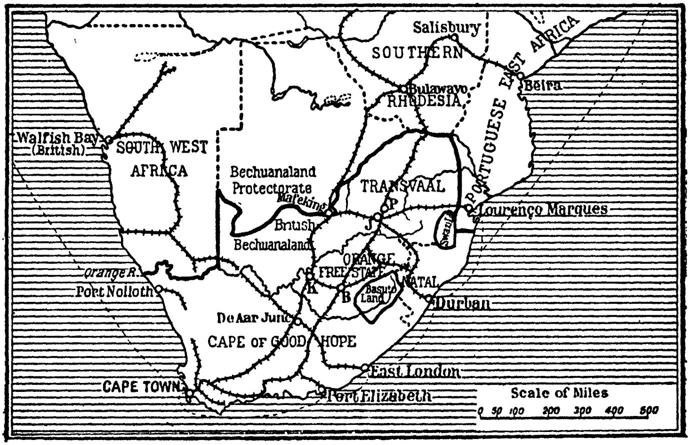


FIG. 23.—Political map of South Africa.

Maize, Kaffir corn, wheat and tobacco are grown. The cultivation of wattles is very important. The bark is used in tanning, an important industry in a land where large numbers of cattle are reared, whilst the trunks find a ready market for use as props in the Rand goldmines. It is in the middle belt that the important Dundee-Newcastle Coalfield is situated.

In the highland area, pastoral occupations are of prime importance, and as Natal has some rain even in winter when the High Veld is almost rainless, many Transvaal and Orange Free State farmers drive their cattle and sheep to this area during the winter months. The rainfall is heavy enough for extensive forests, from which valuable timber is obtained, a boon which is not widespread in South Africa, where dry conditions prevail over the whole of the centre and west.

The administrative centre of Natal is *Pietermaritzburg,* or *Maritzburg,* in the middle belt. The largest town and chief port is *Durban,* whose harbour is almost landlocked. This port is nearer to Johannesburg and the Rand gold-mines than any other British South African port (*cf.* the Portuguese port of Lourenço Marques), and as it has also direct communication with those places, as well as with the Orange Free State, it has a great transit trade, especially in gold and wool. It exports the coal, wool, hides and sugar which form the leading exports of those articles produced within the province. Durban is also a whaling centre of considerable importance.

ORANGE FREE STATE.

Area=50,400 sq. miles.

Population=629,000 { 188,000 Whites.
441,000 Natives.

This little province is entirely ***high veld*** and is, therefore, largely pastoral, except in the wetter east, where agriculture is possible, especially in the valley of the Caledon, where much wheat and oats are grown. Maize, however, is the chief crop, and is largely grown in the east and north-east. Large numbers of cattle, sheep, goats and horses are reared on the grasslands of the High Veld. In the west the diamond mines of the Kimberley district are continued into the Orange Free State, and *Jagersfontein* is an important centre.

Bloemfontein, the largest town and the administrative centre, is centrally placed and enjoys good railway facilities. It is on a line which runs parallel to the main Cape line and traverses the Free State and the Transvaal. A branch line to Kimberley connects the two systems, whilst it has also connections with Port

Elizabeth, East London and Durban (see Fig. 23). The latter connections are important, for the Free State has no port of its own.

THE TRANSVAAL.

Area=110,400 sq. miles.

Population=2,088,000 (544,000 Whites and 1,544,000 Natives).

The Transvaal, or the land beyond the Vaal, may be divided into three distinct physical units. These are—

(*a*) The plateau.
(*b*) The plateau slopes (the *banken*).
(*c*) The low or bush veld.

The plateau may be subdivided into two portions, the High Veld and the Middle Veld. The High Veld is chiefly in the south-east, where an average elevation of over 5,000 feet is attained. It consists of vast, rolling, grassy steppes upon which two-thirds of the cattle, sheep, goats and horses of the province are pastured. We have learned that during the dry winter months many of the farmers of the High Veld trek with their cattle to the borders of Natal. They also go to the *Middle Veld,* the lower and moister parts of the plateau. The Middle Veld has an elevation of from 4,000 to 5,000 feet above sea-level, and has a more diversified surface than the High Veld. It is especially marked by the occurrence of long, bare stony ridges, called "rands." The best known is the Witwatersrand, on the east of which lies *Johannesburg,* the great gold-mining centre (see p. 103). The Middle Veld is not so good for stock-rearing as the High Veld, for the grass is poorer, and the animals eating it are more subject to disease. It has, however, the advantage of having more land suitable for agriculture.

The plateau slopes, or *banken,* are more suitable for agriculture than for stock-rearing. *Pretoria,* on the slopes of the High Veld, and *Rustenburg,* west of Pretoria, are situated in agricultural areas producing maize, wheat, tobacco and fruits. On the lower plateau slopes malaria sets a limit upon the settlement of Europeans.

The Low or Bush Veld covers about two-fifths of the whole country. In the north it begins at about 4,000 feet, and in the east at about 3,000 feet. It is the hottest part of the Transvaal. In the south the mean annual rainfall is about 30 inches, but near the Limpopo it is very slight and the prevailing vegetation is mimosa and thorn bush, interrupted by fairly good pastoral areas. If the summers were not hot and unhealthy, and if the Low Veld were not infested by the tset-se fly, the southern portion could be used for the cultivation of sago, coffee, tobacco and similar crops, whilst the best portions of the north could support large numbers of cattle. As it is, the pasture-lands are quite unsuitable for cattle, except in winter.

The administrative centre of the Transvaal, as well as of the whole Union of South Africa, is *Pretoria,* but the largest and richest town is *Johannesburg.* This city is also a great railway centre, in many respects the chief in South Africa (see Fig. 23). The natural outlet of the Transvaal is through Lourenço Marques, the Portuguese port on Delagoa Bay. The nearest British port is Durban, but as most of the trade of the great mining centre is carried on with England, and as the chief exports of the Transvaal are such articles as will bear the heavy rail charges, a very considerable portion finds an outlet through Cape Town, the nearest port to England. The line to Lourenço Marques passes through an important coal-mining area, of which the largest centre is *Middelburg.* The coal from this district is used in the Rand gold-mines.

SWAZILAND.

Area=6,700 sq. miles.
Population=112,000 (98 per cent. Natives of Zulu race).

This little British possession—it is about the size of Wales—is situated at the south-east corner of the Transvaal. Physically it is a low plateau and forms part of the

Low Veld. It does not form part of the Union of South Africa, but is governed by native chiefs who are under the final jurisdiction of a resident British Commissioner. For customs purposes, however, Swaziland comes under the Union. Both arable and pastoral farming are carried on, and the agricultural and grazing rights of the natives have been carefully guarded. The chief crops are maize, millet and tobacco. The territory is reported to be rich in minerals, and a little gold and tin are at present being mined.

BASUTOLAND.

Area=11,700 sq. miles.
Population=550,000 (1,600 Whites).

This Protectorate, governed by a High Commissioner who represents the King, lies between the Caledon River to the north-west and the Drakensbergs in the south-east. It is largely a High Veld land, although its eastern margins are broken by several ranges parallel and subsidiary to the Drakensbergs. The soil is generally fertile, and the rainfall is abundant, so that both arable and pastoral farming are carried on, and the country supports a relatively dense population. It is largely owing to the natural defensive advantages of the country that the Basutos, a warlike native race, were able to withstand the attacks of the Zulus, who conquered and devastated other parts of South Africa. European settlement is prohibited, the only Europeans in the country being engaged in trade or in government or missionary work. The natives produce and export wheat, maize, Kaffir corn, mohair and wool. There are no railways, no navigable rivers, and the largest town and capital, *Maseru,* is a mere village.

THE BECHUANALAND PROTECTORATE.

Area=275,000 sq. miles.
Population=153,000 (1,700 Whites).

The Bechuanaland Protectorate is physically part of the great African plateau, which is here from 3,000 to

4,000 feet in elevation. It contains portions of two natural regions. The north-east and east are grasslands, mainly of the savannah type, but the west is the dry scrubland of the Kalahari desert margins. The differences are due to differences of rainfall, for in the east the mean annual rainfall is from 18 to 24 inches, whilst on the western margins the amount falls to less than 10 inches. The inhabitants, who are almost entirely natives, are engaged in the rearing of cattle, and in growing maize and Kaffir corn. Johannesburg is the chief market for Bechuanaland meat.

The headquarters of the Administrative Government are at *Mafeking,* a town near the borders of the Transvaal, but in the Cape of Good Hope district of British Bechuanaland. The Cape Railway passes through the eastern and best part of the Protectorate.

SOUTHERN RHODESIA.

Area=150,000 sq. miles.
Population in 1931=1,109,000 (50,000 Whites).

The greater portion of Southern Rhodesia is a plateau whose average elevation exceeds 3,000 feet, although the elevated diagonal tract which forms the watershed between the Limpopo and the Sabi on the one hand, and the Zambezi on the other, exceeds 4,000 feet, and in places, 5,000 feet. It is important to emphasize the factor of elevation, for, although situated within the Tropics, the reduction of temperature owing to altitude gives to a large part of Southern Rhodesia a climate which may be described as temperate, and renders that part of the country above 4,000 feet fit for white settlement. As in Bechuanaland and other parts of the South African plateau the rainfall occurs in summer, and decreases from east to west. Mashonaland, in the north-east, being wetter, is more fitted for agriculture than Matabililand in the drier south-west.

The prevailing vegetation is of the park-land type, *i.e.* savannahs, with forested areas in some of the wetter eastern parts and semi-desert areas in the drier west. The natives keep cattle and grow maize and millet. The European settlers also keep cattle and grow maize, but also tobacco, cotton, citrus fruits (especially oranges) and winter wheat.

Cattle rearing predominates in the drier south-west and maize in the wetter south-east. Markets are at hand in the mining districts of Katanga (Belgian Congo) and of Rhodesia, whilst the introduction of freezing methods may in the near future see Rhodesian meat sent to far-distant parts of the world.

The most valuable products of Rhodesia are, however, its minerals, especially gold, coal, chrome ore and asbestos (see pp. 102–4). Southern Rhodesia is among the world's chief producers of chrome iron ore and asbestos. Gold is found in many scattered small mines, most of them ancient workings re-opened in modern times; the coal mines are at Wankie, while chrome ore and asbestos are mined in several places in the highland belt between Bulawayo and Salisbury.

The chief towns are *Salisbury,* the administrative centre, and *Bulawayo,* at the junction of the Cape Railway with a line giving Southern Rhodesia an outlet through the Portuguese port of *Beira.* More than half of the Southern Rhodesian imports reach the province via Beira.

MOZAMBIQUE.

Area=298,000 sq. miles.
Population in 1930=4,000,000 (35,000 Europeans).

Portuguese East Africa, whose official title is *Mozambique,* occupies the coastal margins of Eastern Africa from the mouth of the Rovuma to Natal. It is a monsoon type of natural region and extends inland for a considerable distance along the Zambezi. The coastal plains are broader than is usual along the African coasts. They are hot, swampy, unhealthy and forested, but the interior is drier. The part of the province north of the Zambezi has been described already (see p. 94). Its leading features are repeated in the southern part. The districts near the Zambezi grow most of the agricultural products at present exported. Sugar, rubber, coconut palms and sisal fibres are all important plantation products, whilst in other parts mangrove-bark and rubber are collected. The chief ports are *Mozambique* (see p. 95), *Chinde, Beira* and *Lourenço Marques*. The last two enjoy considerable transit trade for British territories (see pp. 94, 109, 115). Lourenço Marques, on Delagoa Bay, is the administrative centre of the whole province.

SOUTH-WEST AFRICA.

Area=318,000 sq. miles.
Population=270,000 (estimated), including 32,000 Europeans.

The small population compared with the large size of the country is largely, though by no means entirely, due to the character of the land which it contains. The coastlands and that part of the country south of Walfish Bay are desert lands, but towards the centre, where the land is higher, pastoral farming is possible over large areas, whilst in the north-east, where there is a fair rainfall, it is possible to cultivate cereals and lucerne, the deep-striking fodder plant. In the central pastoral area, cattle predominate in the north and sheep and goats in the south.

But it was the mineral wealth of South-west Africa which led Europeans to exploit it. It is rich in diamonds and copper. The former are found along the coastal margins south of Walfish Bay, the latter in the northern districts. Vanadium, silver, lead and tin are also worked, but are not as important as diamonds and copper.

The best harbour is Walfish Bay, but *Swakopmund,* just north of it, was more important during the years that South-west Africa belonged to Germany. From Walfish Bay and Swakopmund the main line of the country runs to *Windhoek,* the capital, and after traversing the central pastoral belt, strikes south-eastwards and effects a junction with the " Cape to Cairo " Railway at De Aar. A branch of this line feeds the chief diamond region along the coast. Another line from Walfish Bay runs to the northern copper mines (see Fig. 23).

South-west Africa is administered by the Union of South Africa under a mandate from the League of Nations.

EXERCISES.

1. When Bartholomew Diaz, sailing westward, rounded the Cape of Good Hope, the winds were so strong that he called the cape by the name Tempestuoso. Later, when Vasco da Gama was returning from India, he was surprised to find steady winds which helped him to round the cape easily. Can you explain the reason for this?

2. Compare the relative advantages possessed by Cape Town, Port Elizabeth, East London and Durban in competing for the trade of the interior lands.

3. How is it that the ports of Portuguese East Africa enjoy a large amount of transit trade? Give details.

4. Northern Rhodesia is almost twice as big as Southern Rhodesia, but there are nearly ten times as many Europeans in the latter as in the former. Give reasons for this.

5. What was the nature of the obstacle which prevented the early Boer farmers from trekking into Rhodesia from the north of the Transvaal?

6. What different types of Colonial Government are found in South Africa? Give reasons for these differences.

7. Compare Natal with New South Wales (Australia) as regards climate and productions. In a similar manner compare the Cape Town district with that round Perth in West Australia.

8. Mention South African regions or districts which may be styled " Regions of Privation," " Regions of Wandering," " Regions of Increment." Discuss the appropriateness of these names to the regions you select.

9. Explain, by reference to climatic conditions, why it is possible for British South Africa to produce such a wide range of products as wool, wine, pineapples, tea, sugar, wheat and maize.

10. Explain exactly what is meant by the sentence at the top of this page. What other African territories are mandated and to whom was the mandate given?

CHAPTER XIV.

AFRICAN ISLANDS.

EXCEPT Madagascar, most of the African islands are small. Madagascar is a detached portion of the great African plateau, Socotra is a small outlier of the Somali peninsula, whilst Fernando Po, Prince's Island, St. Thomas and Annobon continue the volcanic Kamerun highlands. The remainder are either coral or coral fringed, and are, therefore, found off the east coast (Pemba, Zanzibar, etc.), or are volcanic and rise above submarine plateaus or ridges. In the relatively small number of its islands, Africa offers a sharp contrast to Europe.

ATLANTIC ISLANDS.

All the Atlantic islands are of volcanic origin. The Madeira and Canary groups and the islands of the Gulf of Guinea have already been described (see pp. 39–40 and 76).

The *Cape Verde Islands* lie west of Cape Verde. They are in the track of the north-east trade winds at all seasons, and are, therefore, drier than the Madeira and Canary groups, whose climate is Mediterranean in type; but, where sufficient water can be obtained, "Mediterranean" fruits can be grown, whilst in addition, coffee, tobacco, maize and manioc are also cultivated. Cattle-rearing is carried on, and a considerable number of turtles are caught in the surrounding seas. Porte Grande is a coaling-station for ships. The group belongs to Portugal.

Ascension and *St. Helena* belong to Britain. They were important coaling-stations before the opening of the Suez Canal deflected much of the Indian and Far

Eastern shipping from the Cape route to the Mediterranean and Suez route. They are now used chiefly as Admiralty coaling-stations. Ascension Island is 34 sq. miles in area and consists of several highly coloured volcanic cones, the central one, known as Greenhill, alone showing signs of vegetation. It rises high enough for its upper slopes to benefit from the damp mists to which it owes its verdure. The island is resorted to by large numbers of sea-turtles which come in thousands between January and May to lay their eggs on the sands. Few are exported, but enough are taken and stored in ponds to supply the needs of the inhabitants, who number about 200. Fruit and vegetables are cultivated on the upper slopes of Greenhill.

St. Helena, on which Napoleon Buonaparte was placed after his defeat at Waterloo, and on which he died, has a population of 4,000, and an area of 47 sq. miles. It is a mountainous, well-watered island, many of whose trees have been destroyed, largely by introduced goats, so that much of the soil has been washed away, leaving bare rock faces. Cattle are reared to supply local needs, and the introduction of phormium (New Zealand flax) has led to a government established lace-making industry, which has been very successful. Both Ascension and St. Helena are important cable-stations.

INDIAN OCEAN ISLANDS.

Of these Socotra, Zanzibar and Pemba have been described already (see pp. 59, 63 and 92).

Madagascar.—This large French island has an area of 241,000 sq. miles and a population of 3,700,000. Formerly the island was joined to the mainland. The Mozambique Channel, which separates Madagascar from the mainland, has a depth of nearly two miles. The separation must have been effected in long-past ages, for many of the large animals of the mainland (lions, elephants, monkeys, etc.) are absent in Madagascar, which in turn has some species (*e.g.* lemurs) which are not found elsewhere.

Physically and climatically Madagascar resembles the East African Plateau. It is a plateau from 3,000 to 5,000 feet in elevation, so tilted that it presents a steep escarpment face to the east, and descends by terraces to a coastal plain on the west. Since the east coast is continuously exposed to the south-east trades, it has rainfall at all seasons, and is covered with dense forests, but the plateau and the western coastal plain are leeward areas where the rainfall decreases towards the west and occurs chiefly in summer, when the trade winds reach the plateau. The reasons for these facts are the same as those explained to account for the distribution of rain along the margins of the South African plateau (see p. 98).

Tropical forests cover the lowlands, except in the south-west, where it is too dry for their growth, whilst the plateau is a savannah region. It is, therefore, on the healthy plateau that most of the inhabitants are found.

The chief products of the forest are rubber and tanning bark, although in recent years there has been a marked decrease in the output, whilst on the savannahs of the plateau, cattle-rearing is easily the chief occupation. Rice, the staple article of food, manioc, cotton, cocoa, coffee, vanilla and tobacco are all cultivated products. The mineral wealth is believed to be considerable, but comparatively little attention is paid to it at present. Manioc, rice, hides, raffia fibre, tanning bark and graphite (the chief mineral product) are the leading exports of a country whose foreign trade is very small.

Antananarivo, or Tananarivo, the capital, occupies a central position on the plateau, and is connected with Tamatave, the chief port, by a railway which descends the steep eastern scarp to the coastal plains.

The Mayotta and *the Comoro Islands,* which lie at the northern entrance of the Mozambique Channel, belong to France. The chief products are vanilla, cocoa and sugar.

Réunion is a rugged and mountainous volcanic island lying some 420 miles east of Madagascar. It has an area of nearly 1,000 sq. miles and supports a population of 198,000, of whom 194,300 are descendants of early French settlers and about 2,200 are Chinese. The soil is very fertile, and the chief cultivations are sugar, tapioca, vanilla and coffee. Sugar and rum are easily the most important exports. The island, originally called Bourbon, has belonged to France since 1664.

Mauritius.—Like Réunion, Mauritius is of volcanic origin, but it is not nearly so mountainous, so that although it is only three-quarters the size of Réunion, it supports twice the population of that island. Two-thirds of the inhabitants are Hindus, who are chiefly engaged in the cultivation of sugar, for which the climate is very suitable. Most of the sugar is exported to India, but some is sent to the United Kingdom. *Port Louis,* the chief port, has a splendid harbour. *Rodriguez,* an island lying 350 miles east of Mauritius, and the *Chagos Islands,* situated about half-way between Rodriguez and Ceylon, are dependencies of Mauritius. The coral atoll of Diego Garcia in the Chagos group is used as a coaling-station. Coconuts and coconut oil form the chief products.

The Seychelles and its dependencies (the chief are the Amirante, Aldabra and Providence Islands) consist of ninety islands and islets, whose total area is only 156 sq. miles, of which Mahé, the principal, accounts for one-third. The islands are volcanic, and are generally surrounded by coral reefs. The chief exports are copra, cinnamon oil, coconut oil, vanilla and guano.

Mauritius and the Seychelles belong to Britain, but both were formerly French.

EXERCISES.

1. Discuss the relative importance of different groups of British African islands as coaling-stations or places of call on the great highways between various parts of the Empire.
2. Classify, giving reasons, African islands into two groups: continental islands and oceanic islands.
3. Write a concise account of the geography of Madagascar.

CHAPTER XV.

SOME AFRICAN PROBLEMS.

Africa has many important questions awaiting settlement. The chief of these are in connection with the natives and their relations to their European overlords; the blighting effect of germ diseases, especially in the tropical parts of the continent; the possibilities of European settlement in different parts of Africa; and the many problems which have arisen in connection with commerce, especially that of transport. In this chapter we shall very briefly consider the chief points raised in connection with these problems.

The Problem of the Natives.

The partition of Africa amongst different European nations has taken place in recent times. The different European countries will have to decide in the future such grave questions as to how far the natives should receive civic and suffrage rights, and a fair share of the land, not merely as tenants, but as proprietors. Of course, it would be a great error to attempt such things all at once. It is necessary very gradually to improve the conditions under which the natives live, and to introduce suitable methods of education, but the aim should be so to improve the native that eventually he receives full freedom. It is wrong to treat him as a mere pawn. It should be recognized that the holding of African and other Tropical possessions carries with it sacred obligations, which it is criminal to lose sight of in the haste to develop commercial possibilities. The work accomplished along these lines by Britain brought a happy sequel, for when the Great European War broke out, she found herself supported on all sides by the loyalty of her native African subjects.

Perhaps it is best to recognize that in those parts of Africa where Europeans can settle in such numbers as to form a considerable proportion of the total population, the will and wishes of the Europeans should predominate, always, of course, taking care that native rights are honoured and respected. But in those parts where Europeans are birds of passage, or occupy a country solely for its economic wealth or its strategic importance, the utmost consideration should be given to native desires and ambitions, and they should, when proved to be so fitted, have no small voice in the government of their country. Of course, it must be recognized that African natives vary very much in their capacity for taking part in such important affairs as their own government. It must also be recognized, however, that they are not all Bushmen or Pygmies, and that on the whole the majority are highly intelligent, and are certainly capable of great improvement, as has been clearly demonstrated in South Africa, where native workers—unskilled workers it is true—do their tasks so well that not only is there no great demand for unskilled white immigrants (*cf.* Canada and Australia), but it is clear that with increased education and suitable training an increasing number could undertake skilled work.

Two other problems affecting African natives are of great importance. The first is the exercise of greater control over the trade in alcoholic liquors. The second is the need for a more determined attempt to suppress germ diseases. The first problem is not confined to Africa; we had occasion to refer to it in Book I in connection with the Eskimos, and in Book II in connection with the natives of the Pacific Islands. But in Africa the evil is seen at its worst. It is necessary not only to check, or even to prohibit, the introduction of alcohol, but to control its manufacture by the natives themselves. Although it is very difficult to get at the real truth of the matter, it cannot be denied that many of the native labour troubles, much of the native degeneracy, and other troubles of which we hear from time to time, can be directly or indirectly traced to the consumption of rum and other spirits.

The problem created by germ diseases is not confined to Africa, and it can only be solved by the methods that have proved successful in Tropical America and Asia—the insects themselves must be unceasingly attacked. A great deal has been accomplished by the establishment of schools for the study of tropical diseases, and many scientists have given their lives to this great task. But a great deal more could be done by cutting away or burning the coarse brushwood or herbage so necessary to the existence of pests like the tset-se fly, the chief carrier of disease germs, specially of the dread sleeping sickness.

Incidentally we may note that the tset-se fly is not much larger than the common house fly, and is nearly the same colour as the honey bee. Once heard, its peculiar buzz is never forgotten. Its bite does not startle a horse or an ox, but results in almost certain death. The natives could be taught to build better houses, preferably on the lines of those invented by the more intelligent natives of South-east Asia. These are raised by being built on poles, so that the sleeping apartments are above the level of the ground and of low-flying insects. Schemes of sanitation and the drainage of sheets of stagnant water would also help.

Although it is probable that these diseases are of long standing in Africa, and that they have some connection with the relatively small population, it is certain that they have become more serious since the modern partition of the continent amongst European nations. By their activities the different European nations have stirred up the natives, and the animals too, to such an extent that tribes who formerly had little or no intercourse with each other are now brought into close contact. In this way infected and uninfected natives and animals have intermingled, and diseases formerly restricted to a certain area have been spread.

Germ diseases are not confined to regions like the Equatorial Forests. Dangerous forms of malaria are prevalent in Egypt, in parts of the Atlas region and in several Saharan oases, whilst sleeping sickness, the plague of Tropical Africa, has in recent years invaded Rhodesia and Nyasaland. Nor are they confined to human beings. In the foregoing chapters we have many times referred to the harmful effect they have on animals, so that in Equatorial Africa animals cannot be used as beasts of burden, except in the higher regions which are free from the pest, whilst in other parts the domestic animals are infected with diseases which cause widespread havoc.

Whilst speaking of animals, we may add that it is known they are actual transmitters of diseases. Therefore, whether we like it or not, it looks as though the majority of the African wild beasts will have to be exterminated. But there is no reason why the ruthless destruction of bird-life should proceed, especially of those specimens which are insect eaters. The birds of Egypt have been almost exterminated, with baneful results to the crops. It is, as Sir Harry Johnston has said, more important that birds should be carrying on the useful work of eating insect pests than that they should be killed to adorn the hats of European ladies.

THE SETTLEMENT OF EUROPEANS.

In Book II we had an example in Australia, where the natives are both few in number and of low intelligence, of Europeans or their descendants living in tropical or sub-tropical climates, and adapting, or attempting to adapt, their ways of living to temperate standards. In Africa the reverse is the general rule, for even in the extreme south, which is more a " white man's land " than any other part of the continent, we find that the white population is relatively small, and that whilst the white man is the planter, the ranch proprietor, or the mine-owner, his labourers are almost entirely natives. Therefore, except as proprietors, managers, or in connection with skilled work in relation to railways or telegraphs, or in matters in connection with commerce, education, or government, it does not appear as though there will be a large influx of Europeans in South Africa comparable with that in Canada, Australia, New Zealand, or the United States.

The Atlas region has also possibilities for the settlement of Europeans. Its inhabitants are of white stock, so that it is a "white man's land." But even here it is not likely that there will be any marked settlement of Europeans, excepting in connection with occupations such as those mentioned above. The region has, however, a certain number of Spanish, French and Italian colonists, whose numbers may very well increase.

Elsewhere in Africa the areas where Europeans may make permanent homes are limited by the prevalency of tropical diseases, and by an unsuitable climate. But there are some high and healthy tracts of land in East Africa, particularly in Kenya, in Nyasaland and in Southern Rhodesia, to which reference has been made in the preceding chapters. Not only are these areas suitable for European settlement, but they have the additional advantage of having a relatively small native population. But when everything is said, the fact remains that Tropical Africa is essentially a land for the negro, and is far more suited for him than for a European population, although when, by the elimination of diseases, it has been made safe for white settlement, there will undoubtedly be many openings for large numbers of planters, who, assisted by native labourers, would be engaged in an intensive culture of the land, which would be rewarded by an all-the-year-round production of a wide range of tropical and sub-tropical fruits, vegetables and cereals.

Transport in Africa.

The methods of transporting goods adopted in different parts of Africa are closely related to geographical conditions. Transport by human carriers, the most expensive of all methods, is the chief mode of transport in insect-infested equatorial regions. In the desert long journeys would be impossible were it not for the camel. In the "Mediterranean" regions the mule is the most suitable beast of burden, although it is of less importance in the Cape region than in the Atlas region, where it is well fitted for the difficult hilly tracks. On the grasslands, whether in the tropical savannahs of the Sudan or East Africa, or in the temperate grasslands of South Africa, the ox is invariably used. In South Africa it might be thought that the horse would take the place of the ox, but owing to the prevalence of diseases to which the horse is more susceptible than the ox, the latter is the characteristic draught animal. The Boer trek cart, drawn by a team of oxen, is the commonest means of moving from place to place, and when migrating from pasture to pasture the Boer farmers live and sleep in them.

The Nile, Niger, Congo and Zambezi have always been great highways. In modern times steamboats ply on their waters, although in each case "through" passages are impeded by cataracts, rapids or waterfalls, obstructions which in most cases are partially overcome by railways, which carry goods round the hindrance. This is, of course, a disadvantage, for every fresh handling increases the ultimate cost of the goods being transported.

But it is to the introduction of motor cars and railways that Africa owes most of its modern development. Good motor roads have been constructed in many parts of the continent, especially on the Gold Coast, in South, Central and East Africa by the British, and in Morocco, Algeria, and Tunis by the French. These motor roads are widely used and are most valuable adjuncts to the railways. Even the Sahara is now regularly crossed by motor cars.

A map of African railways shows clearly the present incomplete state of the development of its various regions and countries. There is no transcontinental line, and many lines merely run inland for a short distance from the coast. Probably Africa's first north and south transcontinental railway will be the Cape to Cairo Railway. This great proposal is still very far from completion, for little of its central and most difficult section has been constructed. The northern section, from Cairo to Khartum, is complete, except for the length between Aswan and Wadi Halfa. From Cape Town, the southern terminus, the line has reached Broken Hill, in Northern Rhodesia—that is, if we regard the extension to the Katanga mining region and beyond as a branch. The middle portion will probably pass east of Lake Tanganyika, then west of Lake Victoria, and eventually reach the Middle Nile by way of Uganda.

How will this great railway compare with other transcontinental lines like those of Canada, the United States, and the world's longest transcontinental line, the Trans-Siberian? These are all great east-and-west lines, and possess ports at both termini, from which vessels continue the east-and-west lines. But in the case of the north-and-south Cape to Cairo Railway, these conditions are found at the northern end, but the Cape Town terminus is in the nature of a dead end. Besides, the northern terminus is at the eastern end of the Mediterranean, whilst most of the trade of South Africa is with Western Europe.

It does not seem likely, therefore, either that the completion of the railway will affect very much the great steamship lines between Western Europe and the Cape, or that "through" Cape to Cairo goods traffic will be of considerable extent. Its connections with the coast will, however, be of the utmost importance in bringing the rich products of the interior to the ports. Such connections already exist with Benguela on the west coast, and Durban, Lourenço Marques, Beira, Dar-es-Salaam, Mombasa and Port Sudan on the east coast. Indeed, the present real need of Central Africa is for more outlets to the nearest coast, and these are more urgently required than any north and south through line.

Another transcontinental railway will in the future traverse the western side of the continent. Its construction is not such a dream as may be thought at first sight. What a wonderful thing it would be, providing that tunnels were bored beneath the Straits of Dover and Gibraltar, if we could entrain at Victoria Station, and after a journey across France and Spain, we could traverse the gardens of the Tell, the pastoral lands of the plateau of the Shotts, the wastes of the Sahara desert (stopping to visit the wonderful oases), the rich grasslands of the Sudan (including a stop at interesting cities like Kano), the depths of the Congo forests, the undeveloped grasslands of the southern savannahs, the arid lands of the Bushman and the Hottentot, and if, finally, after a run across the smiling fruit-growing Cape region we could at length find ourselves in Cape Town without having changed our method of travel!

EXERCISES.

1. Discuss the obligation towards the natives which should be recognized by any country having the political and economic control of an African territory. In areas where Europeans have settled, but are in the minority, would you agree with the principle that the Government should rule in the interests of both, but that where the interests of the natives clashed with those of the Europeans, native interests should come first?

2. How far do the African colonies of the various European countries act as: (*a*) homes for surplus population; (*b*) markets for home manufactures; (*c*) sources of supply for the raw materials of manufacturing industries?

3. What means are being taken, or may be taken in the future, to render Tropical Africa free from its present germ diseases? What has been done in this direction in other parts of the world?

4. What parts of Africa may be colonized by Europeans? Give your reasons and illustrate your answer by a sketch map. Compare Africa in this respect with North and South America.

5. What are the various methods of transporting goods adopted in Africa? How are they related to geographical conditions?

6. What is the Cape to Cairo Railway? How far has it been completed? Discuss its part in the economic development of the continent.

THE BRITISH ISLES

CHAPTER XVI.

GENERAL PHYSICAL AND ECONOMIC CONDITIONS.

POSITION AND SURROUNDING SEAS.

THE British Isles are an archipelago of islands lying in the Atlantic Ocean off Western Europe, between the latitudes of 50° and 60° N. Although there are some 5,000 islands, by far the greater part of the total area (121,000 square miles) is made up of the two large islands of Great Britain and Ireland. In the south-east the island of Great Britain comes within 21 miles of the Continent, so that on a clear day the coast of France can be seen from the top of the cliffs at Dover. The British Isles have not always been separated from the Continent. They are really the higher parts of the partly submerged north-western portion of Europe, and the beds of the shallow seas which surround them are really drowned plains and lowlands. Fig. 24 shows the extent of the continental shelf, ledge, or platform above which the islands rise. It is seen to extend to about 100 miles west of Ireland, beyond which the ocean floor rapidly falls to the great abyss of the Atlantic deeps. Even if the continental shelf were only 300 feet below sea-level the greater part of it would become dry land and the British Isles would once more be attached to the mainland. On the other hand, a further submergence of 300 feet would lead to the loss of a considerable portion of the present land surfaces, especially in England where the plains are of greatest extent. The shallowest part of the North Sea is the famous Dogger Bank, located about the west centre of the sea. Over this bank the water is only from 10 to 20 fathoms deep. Thus, although Britain lies so close to the Continent that she can easily maintain relations with those countries lying opposite her shores, for the

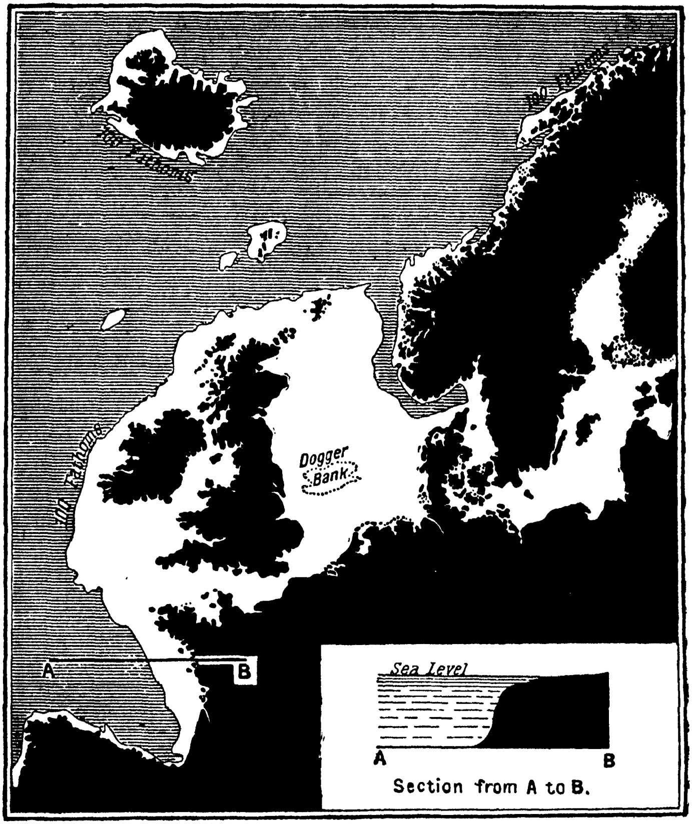


FIG. 24.—The British Continental Shelf.

seas are not too wide to prevent the easy flow of peoples and ideas, yet the sea is her great means of defence and has kept her free from invasion by a foreign foe, whilst many of her peoples have become so much at home on the sea that she is the leading maritime nation of the world.

The Continental Shelf and Fishing.—As in the case of the continental shelf of Newfoundland, the shallowness of the British Seas encourages great fisheries. The sun's rays cannot penetrate to the bottom of deep oceans, but in the shallow waters of a continental shelf there is sufficient light for the growth of marine animal and vegetable life. Many marine plants, such as seaweed, attach themselves to rocks or to the sea floor, but besides these there are countless numbers of microscopic floating plants. These and the tiny, lowly floating animal forms of life found in the ocean form the food of fish which also feed upon each other. The name ***plankton*** is given to this floating fish-food, whether animal or vegetable.

The Continental Shelf and Tides.—Out in the open ocean the amplitude of the tide, *i.e.* the difference between high and low water mark, does not exceed more than one or two feet, but when the incoming tidal waves reach shallow seas and sweep along narrow channels, the waters are heaped up and the amplitude is very considerably increased. When the tidal waves reach funnel-shaped estuaries like that of the Severn, the ever-increasing narrowness of the estuary may produce at its head a rise as high as 40 to 60 feet—although at the entrance to the Bristol Channel the rise of the spring tide is only about 10 feet—and cause the ocean water to proceed upstream like an advancing wall of water. On the Severn this phenomenon is known as the *bore*, and on the Trent, the *eagre*. The high tides experienced in British estuaries make it possible to have ports as far from the open sea as London. The work the tides do for a port like London, in carrying vessels of all kinds upstream with the flow, and in carrying them downstream with the ebb, is not sufficiently recognized. In addition, the constant movement of waters, due to the strongly marked currents of the British Seas, sweeps channels clear and is invaluable to fishing, since the supply of fish food is constantly being renewed.

The Tides of the British Seas.—The height of the tide differs with the relative positions of the earth, the moon, and the sun. Although the sun is so vast compared with the moon, its tide-raising force is not so great as that of the moon on account of the comparative nearness of the latter to the earth. High or spring tides are experienced when the tides produced by the sun and the moon coincide and reinforce each other, a condition of affairs which obtains at new and full moon. Midway between new and full moon, *i.e.* at first quarter, and midway between full and new moon, *i.e.* at third quarter, neap tides occur. These have a smaller amplitude than the spring tides, because the solar and lunar tides are now in opposition and neutralize each other, the total effect being the production of tides of small amplitude.

When the tidal wave approaches Britain, and encounters the high floor of the continental shelf above which she stands, the amplitude of the wave is increased, while in funnel-shaped estuaries exceedingly high tides are experienced.

Summarized we may say that the chief consequences of tidal action are:—

(1) The carrying of marine plant and animal organisms, so that some places have very rich fishing grounds; (2) the allowing of such commercial advantages as the building of a port at a considerable distance from the mouth of a river, the ease with which such ports can be entered or left with the tide; and the possibility of the construction of deep-water locks at such ports; (3) the formation of spits and banks of shingle and sand carried along by the tides, *e.g.* Chesil Beach and Spurn Head.

THE RELIEF OF BRITAIN.

At this stage it is only necessary to obtain a knowledge of the broad outlines of the relief of Britain. The details can be left for consideration in later chapters. Britain has no mountains comparable in elevation with the high mountains of Europe, *e.g.* the Alps. The highest mountain, Ben Nevis, attains a height of only 4,406 feet. Nor are there large areas whose elevation exceeds even half that altitude. But it must be remembered that, in a country like Britain, land rising more than 1,000 feet above sea-level is economically of very little value unless it contains valuable mineral wealth or rushing streams which may be utilized for motive power. The highlands of Britain are to be found chiefly in the west of Great Britain and in detached masses lying round the coastal margins of Ireland. In Scotland three clear physical units are noticed: (1) the Northern Highlands, north of a line drawn from Dumbarton to Stonehaven; (2) the Central Lowlands; and (3) the Southern Uplands. In England and Wales the Pennine Chain is flanked by plains, but is attached by Shap Fell to the Cumbrian Mountains in the north-west. The Cambrian and Cornwall and Devon Highlands are close to the west coast, whilst central and south-eastern England is a great lowland crossed by low ranges of hills. In Ireland, the centre, except for the Slieve Bloom Mountains, is an extensive plain, which reaches the east coast between the Wicklow Mountains and the Mourne Mountains. Notice that this plain faces the Cheshire Plain, which forms a broad gap between the Pennines and the Welsh Mountains. Round the margins of Ireland lie the various highland areas of the north, west and south, separated from each other by plains over which the rivers find their way to the sea.

THE STRUCTURE OF BRITAIN.

The surface rock exercises a marked effect on the life of a region. Upon its nature depend the quality and quantity of the soil, the abundance or the scarcity of surface water, the positions of towns and villages, and in many cases the character of the occupations followed. The geological formations of Britain are exceedingly varied and complex (see Fig. 25). They are closely related to those of the Continent, *e.g.* the highlands of N.W. Ireland and Scotland are continuations of those of Scandinavia, the chalk ridges of S.E. England are continued in France, S.W. England is a counterpart of Brittany. In Britain, it is not so in all countries, the highest elevations are composed of the oldest rocks, which are also the hardest. There is a remarkable contrast between that part of Britain lying south and east of a line drawn from the mouth of the Exe in Devonshire to the mouth of the Tees, and that part lying north and west of that line. North and west of the Tees–Exe line are most of the highland regions of the British Isles. This part of the country is largely composed of rocks older than the coal measures. The sandstones are hard and gritty, the clays, under the influence of enormous pressure, have become slates, the limestones are crystalline, and in many places have become hard marble, whilst there are extensive areas of very ancient igneous rocks such as granite and gneiss. South and east of the Tees–Exe line is an extensive lowland, crossed by low, scarped hills usually running in bands in a N.E.–S.W. direction, and composed of rocks younger than the coal measures, *e.g.* new red sandstone, clays, oolitic limestone, and chalk. The structural differences between these two parts of Britain have had an enormous effect not only upon the industry and occupations of the inhabitants, but upon the inhabitants themselves and upon their history. The north-western part has the boldest and most rugged coasts; the highest, the barest, and most infertile, and therefore the least populated, areas of Britain; whilst the south-eastern part has lower coasts, excepting where the hills run out to the sea, *e.g.* at Beachy Head, Dover, and Flamborough Head; but it is there that the richest agricultural lowlands are to be found, and it was there that, until the days of the modern manufacturing epoch which depends upon supplies of coal and iron, the bulk of the people lived.

During the Great Ice Age, North-western Europe and the greater part of the British Isles were covered by ice sheets and glaciers which had gradually spread outwards from the north. Evidences of the changes wrought by the action of ice are widespread. Mountain masses were rounded; valley lakes, like those of the English Lake district and of Scotland, were formed by the deposition of moraine materials which dammed river valleys; great sheets of boulder clay were left; steep-sided ridges and banks of stratified deposits of sand and gravel, called *kames* in Scotland and *eskers* in Ireland, were formed in tunnels made by streams flowing under the ice; whilst last, but in importance by no means least. it may have been the enormous weight of the ice which caused the depression of the whole of North-western Europe.

THE CLIMATE OF BRITAIN.

Temperature.—Fig. 26 gives the mean January and July sea-level isotherms. In January, the temperature falls from west to east and not from south to north. This

Place.	Latitude.	Mean Jan. Temperature.	Mean July Temperature.	Remarks.
Valentia Island (S.W. Ireland)	52° N.	45° F.	59° F.	Very equable types.
Plymouth	50	42	61	
Cambridge	52° N.	38° F.	62° F.	Greatest mean annual range.
London	51	38	64	
Ventnor	50° N.	40° F.	62° F.	Southern, northern and middle latitude towns.
York	54	38	60	
Wick	58	39	53	
Fort William	56° N.	39° F.	57° F.	Two east and west pairs of towns.
Aberdeen	57	37	57	
Bristol	51	40	63	
London	51	38	64	

[This table should be referred to whilst reading the section on Temperature.]

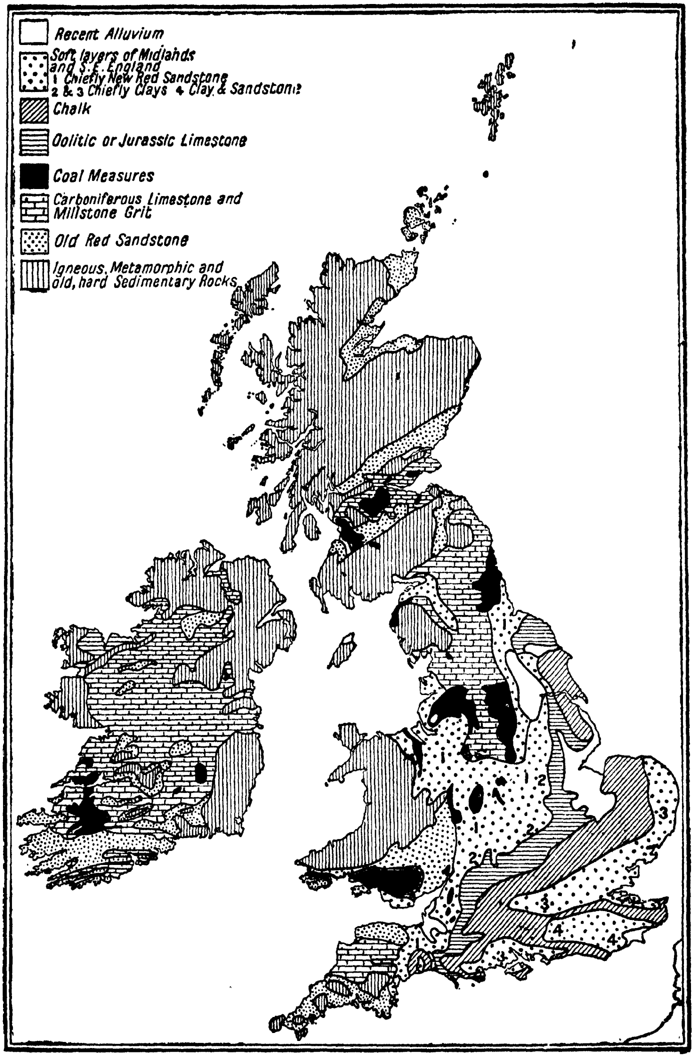

Recent Alluvium
Soft layers of Midlands and S.E. England
1 Chiefly New Red Sandstone
2 & 3 Chiefly Clays 4 Clay & Sandstone
Chalk
Oolitic or Jurassic Limestone
Coal Measures
Carboniferous Limestone and Millstone Grit
Old Red Sandstone
Igneous, Metamorphic and old, hard Sedimentary Rocks
1
2
3
4

FIG. 25.—Geological map of Britain (simplified).

is indicated by the north and south direction of the isotherms—of which that of 40° F. may be regarded as typical. It is thus clear that at this time of the year distance from the Equator, upon which the height of the sun throughout the year depends, is not of such great importance as distance from the warm Atlantic Ocean. The coldest area in Ireland is the eastern part of the Central Plain, and in Great Britain the east coast. In July, the isotherms take an east and west direction, showing that temperature decreases from south to north. The southerly bends over seas and the northerly bends over Ireland and Great Britain are, of course, due to the greater heat of the land compared with the sea. The warmest part of Britain is seen to be in the south-east, which is least affected by the cooling of the great ocean to the west and at the same time receives the sun's rays less obliquely than the north.

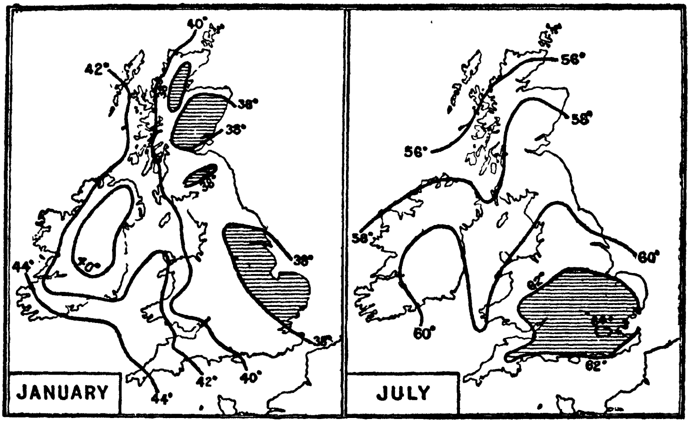


Fig. 26.—Mean Sea-level Isotherms.

The part of Britain with the greatest range between summer and winter is the south-east, where a large area has a January temperature less than 38° F. and a July temperature exceeding 62° F. The most equable temperatures are experienced in western Ireland and south-western England, where the mean annual range of temperature is only about 16° F. No part of Britain has what is known as an extreme or continental type of climate. Its insular position on the western margins of a continent makes this impossible. Everywhere its climate is typically temperate and equable, yet it is well to remember, even within the limits of Britain, which parts have a greater or less range of temperature than others.

Rainfall.—There is a very close connection between relief and the distribution of rainfall (see Fig. 27). More rain falls on the higher western margins than on the lower eastern parts of both Ireland and Great Britain. The east receives a smaller rainfall than the west, not because the greater part of the rain has fallen in the higher west, but simply because the prevailing westerly winds are not forced to ascend any greater elevations than those of the comparatively low chalk ridges of south-eastern England, or, in the case of the Highlands of Scotland, where the Eastern Grampians are as high as the Western Grampians, the plateau-like configuration of the whole gives no further marked ascent as the winds proceed eastwards.

Cyclones and Anticyclones.—The climate of the British Isles is so much affected by cyclones and anti-cyclones, especially the former, that we had better understand something of their essential characteristics. Just as we find eddies or whirls in the water flowing along a river, so there are eddies or whirls of air in the great drift of air which crosses the British Isles from west to east. The air eddies are called *cyclones* and they cover great areas over which the atmospheric pressure is lowest in the centre and highest towards the edges. As air moves from high pressure to low pressure there is a general inflowing of air towards the centre of a cyclone. These inflowing winds are deflected by the rotation of the earth to the right and thus the whole system tends to turn in a counter-clockwise direction. At the same time it moves eastwards or north-eastwards in the direction taken by the

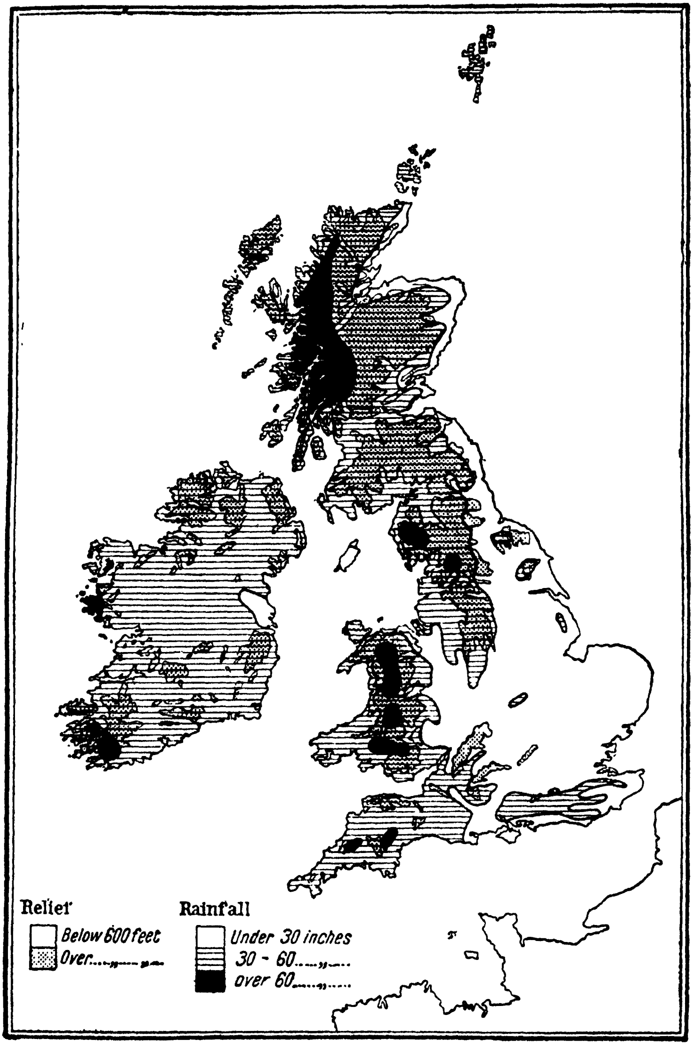


FIG. 27.—The Distribution of Rainfall marked on a map showing the land over 600 feet above sea-level.

prevailing winds (see Fig. 28). This movement can easily be checked by comparing weather maps of successive days during which cyclonic conditions prevail.

As the air currents in a cyclonic system are moving towards the centre, the pressure is decreasing and therefore expansion and upward movements of air are caused. This produces cooling, and that in turn causes rainfall to occur. It should be noted that this rainfall is produced without the air of mountains. Therefore, when cyclones cross the western mountains of Britain there are two factors at work in the production of rain. In the eastern lowlands, however, most of the rain which falls must be of simple cyclonic type.

Many geographers prefer to restrict the term cyclone to violent storms like those experienced in the West Indies. These have the same general characteristics as the cyclones of Western Europe, but they are far smaller in size; their barometric differences occur suddenly, and they move forward at tremendous speeds. Hence the cyclones experienced in Western Europe are often called simply "lows" or "depressions." On the average one of these depressions reaches Britain every ten or eleven days, but they are more frequent in winter than in summer. They are usually accompanied by changeable winds, unsettled weather and rain.

Less frequently the British Isles are under the influence of high pressure or anti-cyclonic conditions, and at such times fine weather, if by that term the absence of rain is meant, is usually experienced. If anti-cyclones occur less frequently than cyclones, they are more enduring. They are marked by calm weather and an almost invariable absence of rain, and they occur in winter quite as frequently as in summer. Fig. 29 shows that in anti-cyclones the highest pressure is in the centre of the system. Therefore winds blow outwards and they are not so strong as in cyclones because the barometric differences are not so great.

Summarizing the climatic conditions of Britain we may say that everywhere except on the highest mountains the climate is equable, with the least range of temperature in the west and south-west and the greatest in the east and south-east. The distribution of rainfall, as in all temperate countries, shows a marked relation to the relief, and is heaviest on the windward and higher west than on the leeward and lower east.

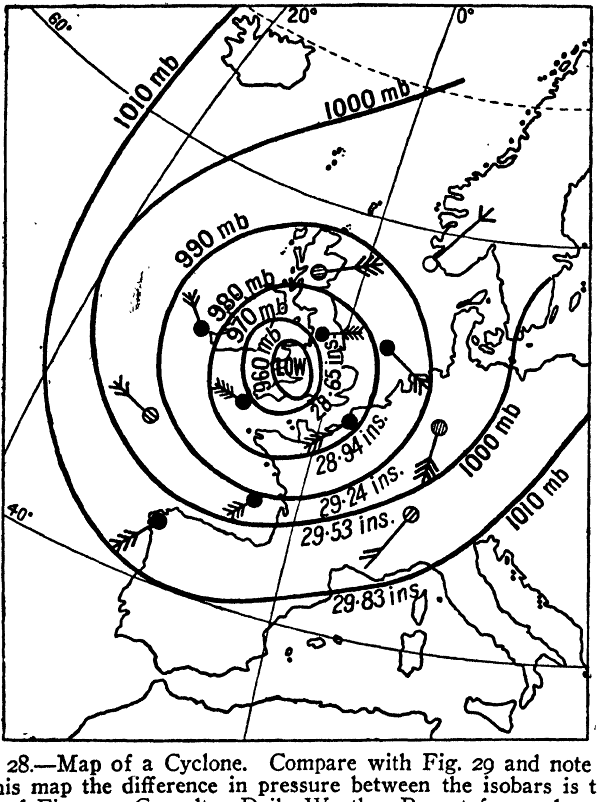


FIG. 28.—Map of a Cyclone. Compare with Fig. 29 and note that in this map the difference in pressure between the isobars is twice that of Fig. 29. Consult a Daily Weather Report for explanations of the methods of showing (*a*) the strength of the wind, (*b*) the weather at the various points indicated.

Plants and Animals of Britain.

Long ago the British Isles were clothed with forests which were mainly of the deciduous or broad-leaved kind.

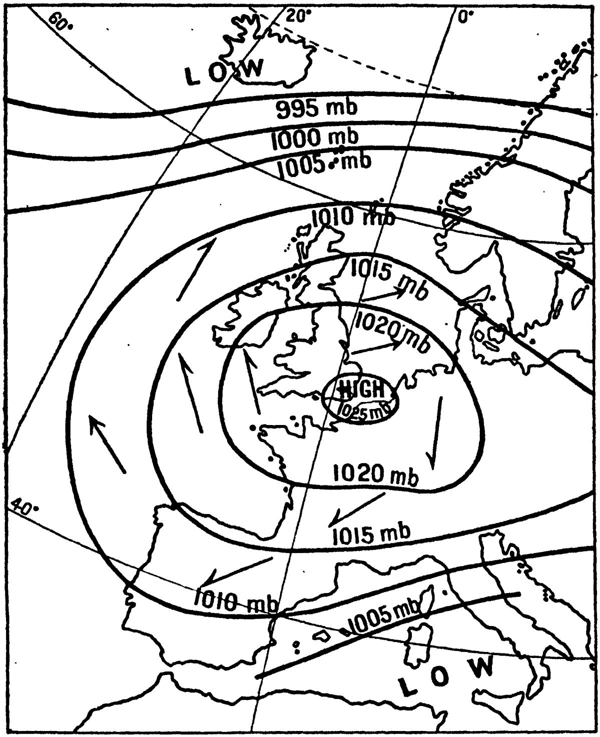


Fig. 29.—Map of an Anti-cyclone. Compare the movement of air shown on this map with that shown on Fig. 28.

These forests to-day only exist in samples, *e.g.* the New Forest of Hampshire and the Forest of Dean in Gloucestershire. The famous forests of Arden, Epping, Sherwood and the Weald have almost disappeared, whilst the deer " forests " of the Highlands of Scotland are really open heaths and moorlands. Very little

British grown timber is now used, except, of course, in war time, most of the country's needs being met by the importation of timber from Scandinavian and Baltic countries. In many ways the afforestation of regions unsuitable for agriculture or other purposes is an urgent necessity. The deer "forests" of Scotland could produce as good timbers as Scandinavia, and in doing so would certainly be of greater value than at present. The afforesting of Highland regions would also regularize the water supply to the rivers and would probably make many of the falls of great value in providing electrical power for use in lumbering and allied industries. Statistics published by the Board of Agriculture should be consulted (see above). They show that there is considerably more mountain and heath vegetation—that is, almost barren moorlands where little grows except poor grass, moss, heather and bracken—than forest. These moorlands are chiefly found at elevations exceeding 600 feet, so that in this respect England has a smaller proportion of moorland than Scotland, Ireland or Wales.

STATISTICS.

General distribution of the surface of the British Isles:—

Divisions and Year of Survey	Total Surface (1000 acres).	Woods and Plantations (1000 acres).	Mountain and Heath Grazing Land (1000 acres).	Permanent Pasture (1000 acres).	Arable Land (1000 acres).
England[1]	32036	1,697	3495	13,158	9,654
Wales[1]	5,099	187	1631	2,122	656
Scotland	19,070	852	9897	1,513	3,169
Irish Free State	17,019	249	2124	8,455	3,726
Isle of Man	141	1·4	34	19	61
Channel Isles	44	·2	2	10	21

[1] England excludes, and Wales includes Monmouth.

The most valuable pastoral and agricultural lands are the permanent pastures and the arable lands. Most of the moorlands are also used for pasture, as, for example, central Wales and Exmoor, so that the permanent pastures should be added to the moorlands to give the

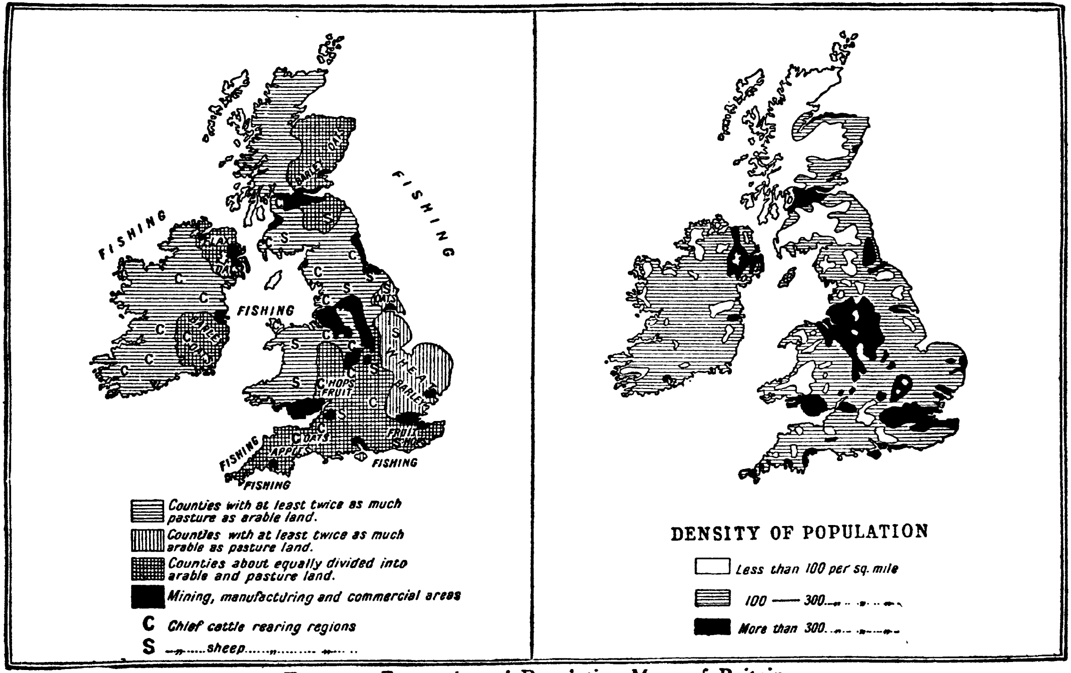

FISHING
FISHING
FISHING
FISHING
FISHING
FISHING
FLAX
OATS
BARLEY
OATS
BARLEY
OATS
WHEAT
BARLEY
HOPS
FRUIT
OATS
APPLES
FRUIT
HOPS
C
S
Counties with at least twice as much pasture as arable land.
Counties with at least twice as much arable as pasture land.
Counties about equally divided into arable and pasture land.
Mining, manufacturing and commercial areas
C Chief cattle rearing regions
S " sheep " "
DENSITY OF POPULATION
Less than 100 per sq. mile
100 — 300 " " "
More than 300 " " "

FIG. 30.—Economic and Population Maps of Britain.

total land used for grazing. The permanent pastures may be divided into rich pastures, like those of the plains and vales of central and western England, south-west Wales and central Ireland, and the poorer pastures, which include the moorlands and hill pastures like those of the scarplands of south-eastern England. The best arable lands are found in the drier lowlands of eastern England, for land which is too high and steep or too wet cannot be used for agriculture on an extensive scale (see Fig. 30).

Cultivated Plants.—Of the cultivated crops of Britain *wheat* is the most important cereal. It is most extensively grown in the eastern counties of England, where suitable climatic and soil conditions are found. Wheat requires a sufficient but not too heavy rainfall, as too much rain causes the plant to become diseased. It also requires a warm and sunny summer in order to ripen and give a good colour to the grain, whilst it is best grown in a stiff fertile soil like the boulder clay which covers large areas of eastern England. The average East Anglian yield in bushels per acre, over 30, exceeds that of any other country in the world, and yet only about one-fifth of the wheat used in Britain is home grown! The cultivation of *oats* and *barley* is more widespread than that of wheat, as these cereals do not require so much sun and will thrive in poorer soils. Root crops, such as *turnips, swedes* and *mangolds,* are grown for winter food for cattle and sheep. Formerly it was the custom to kill cattle in autumn and to salt the flesh for winter use, a practice which resulted in skin diseases being widespread. *Potatoes* form a most important article of human diet, especially in Ireland, where enormous quantities are grown, although unfortunately Irish potatoes are liable to disease. The best British potatoes are grown in eastern Scotland and eastern England. Of *fruits,* apples, pears, plums, cherries, etc., are all very largely grown. The chief areas where these are produced on a large scale are on rich lands like those of the Weald, the lower valleys of the Severn and its tributaries the Warwickshire Avon and the Wye, and the Carse of Gowrie, which lies between the Sidlaw Hills and the Firth of Tay. Early fruit, vegetables and flowers reach London and other centres from S.W. England, the Scilly Isles and the Channel Isles. *Hops,* for the making of beer, are largely grown in Kent and

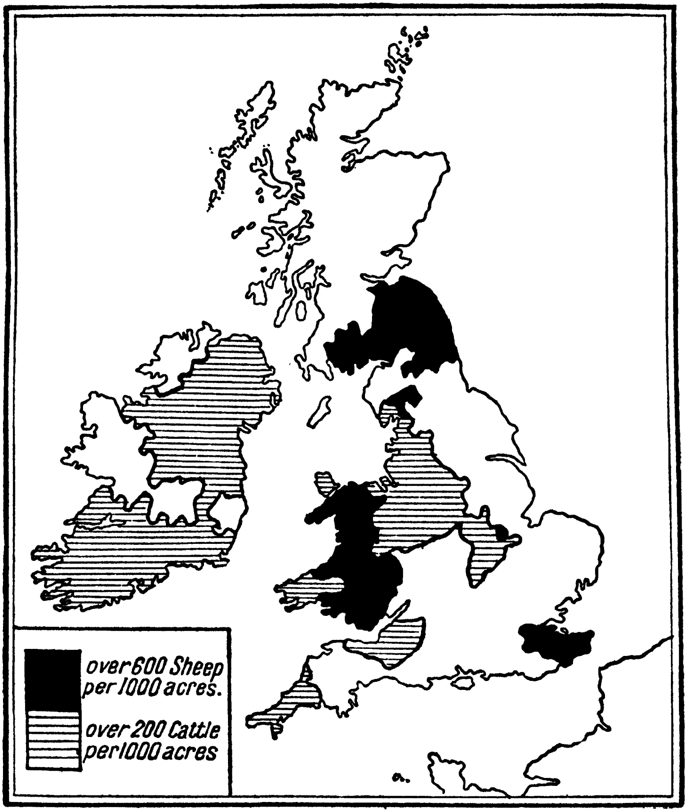

over 600 Sheep per 1000 acres.
over 200 Cattle per 1000 acres

FIG. 31.—The Distribution of Cattle and Sheep.

in the middle basin of the Warwickshire Avon. Of fibre plants, *flax* is grown in Ulster, although not in sufficient quantities to keep pace with the demands of the Irish linen industry.

Pastoral Occupations.—Although cattle, sheep, pigs and horses are all reared in large numbers, the home supplies of meat, hides, dairy produce, mutton, wool, bacon and horses have to be supplemented by large imports. Where *cattle* are most numerous *sheep* are usually least so, except in such areas as really suit neither, and where neither are found in very large numbers, *e.g.* the Highlands of Scotland. Fig. 31 shows that there is practically no overlapping of those areas where there are over 200 cattle per 1,000 acres, with those supporting 600 sheep per 1,000 acres. The reasons for this are that the richest pastures are best suited for dairy cattle, whilst sheep thrive best on the drier, poorer mountain pastures of the west and of the porous chalk and limestone hills of eastern England, where they are less liable to suffer from foot-rot. The best cattle pastures are the central plain of Ireland, the western plains of Devon, Somerset, Hereford, S.W. Wales, Lancashire, Cheshire and the English midlands. In all these places the rainfall is fairly heavy and supports rich grass. Hence we have the famous cheeses of Cheddar and Cheshire, the noted Irish butter and Devonshire cream, and the extensive boot and shoe industries of towns like Northampton and Leicester. Sheep are largely reared on the poorer pastures of the southern uplands of Scotland, the Highlands of Wales, and the oolitic and chalk scarplands of the E. and S.E. of Great Britain. Thus we have the woollen industries of the Tweed valley, the upper Severn valley, of Yorkshire and of Leicestershire. In the middle ages Britain exported most of her wool to Flanders, but to-day she has to supplement her home supply by importing wool from Australia, New Zealand, South Africa and Argentina.

Pigs are chiefly found in those areas noted for the rearing of cattle. The reason for this is that they are largely fed on skimmed milk and potatoes. Ireland is especially famous for its bacon and hams, and so are Wiltshire, Cumberland and Yorkshire. Despite the modern methods of transport by steam and electric railway and by petrol driven cars, *horses* are still in great demand for work on the land as well as for sport and military purposes. They are largely reared on the drier plains of Ireland, Scotland and England, and in areas noted for the growing of oats. Clydesdale, the Vale of York, and the East Riding of Yorkshire have long been noted, not only for heavy cart-horses, but also for lighter horses suitable for carriage and general light draught purposes. Small ponies are reared in the Shetland Isles, the Highlands of Wales and Scotland, and on Exmoor and Dartmoor in south-western England. Modern methods of haulage are now, fortunately, superseding the use of ponies in coalmines. Most of those now reared are used for very light draught or pleasure purposes.

The Mineral Wealth of Britain.

Coal is by far the most important mineral mined in Britain. British coal is not only used in the home manufacturing and engineering industries; but a considerable quantity—over 25 per cent.—is exported. This is partly accounted for by the fact that most of the country's imports are raw materials of a bulky nature, and take up considerably more room in ships than the more compact manufactured articles which largely comprise the exports. Thus, ships on outgoing journeys often carry coal instead of ballast, a device which cheapens freightage charges on imports, for the ships have not to return empty. It will be noticed that many of those countries to which Britain exports coal have little or no home supply of this important mineral, *e.g.* Italy, Sweden, Argentina, Denmark, Egypt, Norway, Holland, Brazil, etc. The three principal coalfields, in order of total weight of coal mined, are (i) the Yorkshire, Derby, and Nottingham; (ii) the Northumberland and Durham; (iii) the South Wales. Very interesting developments are taking place on the first-named coalfield, for deeper mines are now being sunk to reach coal which was once thought to be too deep for mining. This coal is found to the east of the older pits, and the shafts are deeper because the coal measures dip deeper and deeper below the surface the further eastwards they go. Indeed, the newer pits are mainly in places which are not marked as coal measures on ordinary geological maps.

Coal and iron are fortunately found either together or very near each other, thus saving the time, money and labour often involved in bringing iron ore to the coalfields to be smelted. In almost every case, too, limestone, which is of great value as a flux in the smelting process, is close at hand. Only a small and insignificant amount of iron ore is exported, whilst the chief imports are high grade ores from Spain and Sweden. The development of the coal and iron resources of the country has led to marked changes in the distribution of the population, which is now most densely concentrated in the manufacturing regions of the coalfields themselves, as will be evident from Fig. 27. Iron has been smelted in Britain since Roman days at least, and until the days of coal the operation was chiefly carried on in the forested districts where timber was available for fuel. It is probable that most of the old ironwork of London and S.E. England was made of Wealden iron smelted in the Wealden forests, a fact which partly accounts for the vast forest clearings which have taken place in that part of England.

Of the minerals found in Britain in smaller quantities, *lead* is mined in the Lead Hills of the southern Uplands of Scotland, in the southern Pennines, in Cumberland, and in the Wicklow Mountains of Ireland. *Copper* and *tin* have been mined in Cornwall from earliest times, but the present output is very small and most of the copper smelted in South Wales is imported. *Salt* is valuable not only for domestic purposes, but as the basis of many chemical products, one of which, soda, is largely used in the manufacture of soap and glass. It is chiefly obtained in Cheshire, between Northwich and

Nantwich; in Worcestershire, at Droitwich; and in southern Durham. In all these places it is obtained from brine. *Oil shale* is obtained in Linlithgowshire, and from it paraffin wax and petroleum are extracted. Recent borings for oil in the English Midlands have only met with a fair amount of success.

Building stones and slates are quarried in many parts of Britain. The granite of Aberdeen and Peterhead, the marble of Derbyshire and western Ireland, the sandstones and limestones of the Pennines and the oolitic ridges, the slates of the Snowdon district and Cumberland are all famous. *Chalk* is quarried in many places, and is used for the manufacture of lime and cement. *Clay* is extensively utilized in brick-making, whilst the clays of North Stafford are used for making earthenware, and the finer white kaolin or china clay of Cornwall for porcelain.

EXERCISES.

1. What would be the leading changes which would occur in the coastline of the British Isles if they were (*a*) submerged 100 fathoms, (*b*) uplifted 100 fathoms?

2. Draw a few selected sections to illustrate the outline of the Continental Shelf of Western Europe. Add brief comments.

3. How has the fact that Britain stands on a Continental Shelf affected (*a*) fishing, (*b*) tidal phenomena?

4. " A tremendous amount of coal is now used in the manufacture of electricity, which is conveyed from well-placed power works to all parts of the surrounding areas." Give an account of this development, if possible illustrated by a map of the grid system.

5. The following table gives approximately the height of water at Hull during 24 hours on a particular day. Plot the numbers and state what you can learn from your graph.

Time.	Height of Water.	Time.	Height of Water.
12.0 midnight .	15½ ft.	12.0 noon . .	15½ ft.
1.0 a.m.. .	12 ,,	1.0 p.m. . .	12 ,,
2.0 ,, . .	9 ,,	2.0 ,, . .	9 ,,
3.0 ,, . .	7 ,,	3.0 ,, . .	7 ,,
4.0 ,, . .	9 ,,	4.0 ,, . .	7 ,,
5.0 ,, . .	13½ ,,	5.0 ,, . .	10 ,,
6.0 ,, . .	17½ ,,	6.0 ,, . .	14½ ,,
7.0 ,, . .	22 ,,	7.0 ,, . .	18½ ,,
8.0 ,, . .	24 ,,	8.0 ,, . .	22 ,,
9.0 ,, . .	25 ,,	9.0 ,, . .	23½ ,,
10.0 ,, . .	23 ,,	10.0 ,, . .	23 ,,
11.0 ,, . .	19 ,,	11.0 ,, . .	22½ ,,

6. The following table gives the height of the high water at the London Docks during a lunar month. Plot the figures. What connections do you notice between the height of the water and the phases of the moon? What is the difference between this graph and the previous one?

Age of Moon.	High Water.	Age of Moon.	High Water.
0 (new)	28½ ft.	15 days (full)	28 ft.
1 day	29 ,,	16 ,,	28½ ,,
2 days	28½ ,,	17 ,,	29 ,,
3 ,,	28 ,,	18 ,,	29 ,,
4 ,,	27½ ,,	19 ,,	28½ ,,
5 ,,	27 ,,	20 ,,	28 ,,
6 ,,	26½ ,,	21 ,,	27½ ,,
7 ,,	25½ ,,	22 ,, (Last Qtr.)	26½ ,,
8 ,, (First Qtr.)	25 ,,	23 ,,	26 ,,
9 ,,	24½ ,,	24 ,,	26 ,,
10 ,,	25 ,,	25 ,,	26 ,,
11 ,,	25½ ,,	26 ,,	26½ ,,
12 ,,	26 ,,	27 ,,	27 ,,
13 ,,	26½ ,,	28 ,,	27½ ,,
14 ,,	27 ,,	29 ,,	28 ,,

7. What contrasts are there between the parts of Britain which lie on either side of the Tees-Exe Line?

8. Using Appendix I of the Daily Weather Report make temperature maps of Britain for each month.

9. On an outline map of the British Isles shade (*a*) land over 600 ft. above sea-level, (*b*) areas where the mean annual rainfall is less than 30 in., from 30 to 60 ins., over 60 ins. Write an account of the facts brought out by the combination in one map of these two factors.

10. On maps of the British Isles on which the outlines of the counties have been traced, shade the counties to show the distribution of arable and pasture land, of cattle and sheep, and of wheat, using such statistics as are available in the returns published by the Board of Agriculture. Take particular pains with the choice of index to each map.

11. Using tables of statistics from *Whitaker's Almanack*, the *Statesman's Year-Book*, or the Board of Trade Returns, make a table of the output of coal on the various British coalfields. Now make a list of the countries to which coal is exported. Represent these statistics in some graphical manner.

12. Using the returns of the Board of Agriculture, or the figures given in the *Statesman's Year-Book*, make a table showing the distribution of woods, pasture lands, arable land, etc., in Britain. Account for any differences you notice between the countries.

13. Consult a copy of the Report of the Royal Commission on the Coal Industry (1925) and read the interesting section dealing with the general position of the coal industry in Britain, the national coal resources, etc.

CHAPTER XVII.

NORTHERN ENGLAND.

PHYSICAL FEATURES.

THE outstanding feature of the relief of Northern England is the *Pennine Chain,* a great earth-fold built of mountain limestone. The Pennines, which are about 120 miles from north to south and are not very high compared with their breadth (Cross Fell, the highest peak, is only 2,892 feet), are nearer the west coast than the east coast, so that the longer rivers flow to the North Sea. Their tops are extensive moorlands, and being rounded, may be aptly compared with the representation of the King's head, standing up from a penny in low relief. It is important to understand and to visualize this feature of the Pennines very clearly. Formerly the mountain limestone of the Pennines was covered with layers of millstone grit and coal measures (Fig. 32); but these have been denuded, so that the coal measures are now only found at the four corners shown on Fig. 34. To the north the Pennines are separated from the Cheviot Hills, whose southern slopes form the highlands of Northumberland, by the narrow gap drained by the South Tyne. This is the famous *Tyne Gap,* which gives easy communication between Newcastle and Carlisle. About the centre of the system the river Aire has made another gap, the *Aire Gap,* which we shall also refer to later, on account of the important routes which follow it. Midway between the Aire and Tyne Gaps, the Pennines are attached to the Cumbrian group of mountains by a plateau which is over 1,000 feet in elevation, and is a difficult barrier which must be crossed by the routes to Carlisle. Overlooking the valley of the Eden the great Pennine Fault forms precipitous cliffs, above which towers Cross Fell. The formation of this fault let down the rocks on the west, which were formerly at the same level as Cross Fell Edge, and thus exposed to the east of the Eden valley the steep stopes of the fault face.

Of the Pennine rivers, those flowing eastwards, such as the Tyne, the Tees, and the headstreams of the Yorkshire Ouse, have all cut a series of dales which offer routes across the mountain barrier. The western rivers are shorter, but they reach the sea independently of each other (*cf.* the Yorkshire Pennine streams) and all possess estuaries due to the sinking of the lower portions of their valleys. Only one of these estuaries, that of the Mersey, is, however, of first-class importance.

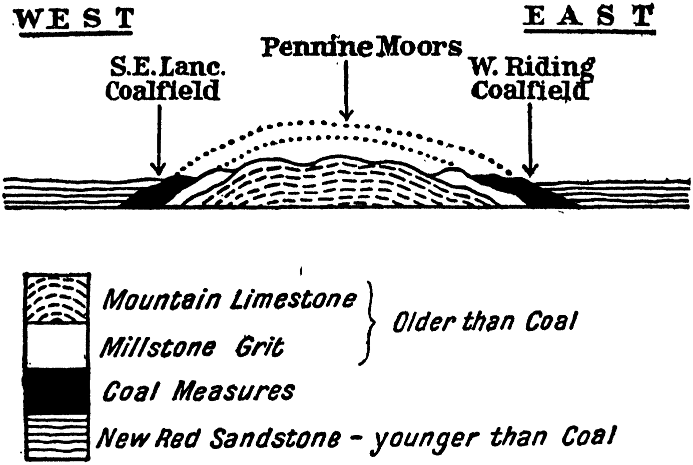


Fig. 32.—Section of Pennine Chain.

The Lake District.—The Cumbrian Mountains have been made by the denudation of an ancient uplift largely composed of volcanic rocks, which have given to the district much of its beauty. Scawfell Pike (3,210 feet), the highest mountain in England, is composed of hardened volcanic ash. Helvellyn (3,118 feet) and most of the other high peaks are also volcanic, but Skiddaw (3,054 feet) is built of slates. Owing to the dome shape of the original uplift the valleys radiate from the centre like the spokes of a wheel. Most of them are partly filled by lakes whose great depth points to the fact that the valleys must have been subjected to erosion over a very long period of time. The lakes themselves are typical long and narrow valley lakes often formed by the accumulation of water behind morainic barriers left by the glaciers which formerly occupied the valleys. They are drained by rivers which are busily engaged in accumulating deltaic materials at the points where they enter the lakes, so that eventually the lakes will disappear, and in their place there will be small, fertile, lake plains. In this connection notice that Derwentwater and Bassenthwaite are both in one valley, and that they have been formed by the growth of deltas which cut a former single lake into two portions, now separated from each other by a small lake plain.

The remaining highland areas of Northern England are found in two isolated masses east of the Pennines. The first is the *Yorkshire Moors,* which form part of the belt of oolitic limestone, including Edge Hills and the Cotswolds. The *Yorkshire Wolds* are separated from the Moors by the Vale of Pickering, drained by the Derwent. They form the northern part of the chalk scarplands, in which breaches have formed the Wash and the Humber. Both the Moors and the Wolds have steep faces looking north-west and north (see Fig. 45).

The Plains.—The southern Pennines are surrounded on three sides by broad plains which reach the sea on the west, extend to the Moors and Wolds on the east, and to the oolitic limestone escarpment on the south. These plains are composed of new red sandstone, and are covered in parts, especially in the Vale of York, with fertile boulder-clay and alluvium. The coastal plains bordering the Cumbrian Mountains are very narrow, but broaden out into the extensive plains of Solway Firth and the lower Eden valley. On the east coast the coastal plains of Northumberland and Durham are narrow, but extend inland along the valleys of rivers like the Tyne and the Wear, and become broader towards the south. The *Vale of Pickering* gives the Vale of York an access to the sea between the Moors and the Wolds. The river Derwent, which drains it, rises very close to the east coast. Formerly it flowed to the North Sea, but its outlet was dammed by moraines and its waters diverted to the Ouse. The remaining plain is *Holderness,* forming the long, narrow, low peninsula terminating in the low Spurn Head, which is built of materials carried southwards by currents. Holderness is formed of glacial drift, clays and sands. No part of it exceeds 100 feet in elevation.

COALFIELDS.

Northern England is the most important industrial region of Britain. Its four coalfields lie on the south-west, north-west, north-east and south-east flanks of the Pennines (see Fig. 34).

I. *The S.E. Lancashire Coalfield.*—The factors which have most influenced the development of the Lancashire industrial region are its abundance of coal, its water supply, its climate and its position. Formerly, much iron was also found, but the supply is now almost exhausted, so that iron has to be imported. The abundant water supply from Pennine streams was important in supplying power in the earliest stages of the region's development, whilst it is now invaluable for industries like bleaching, as well as for supplying the domestic needs of a very large industrial population. The climate has been instrumental in the determination of the kind of manufacturing the region was best suited for. The prevailing westerly and south-westerly winds are so heavily laden with moisture that the humidity of the air is constantly high, and as the brittle cotton threads break if spun in a dry climate, the humid atmosphere of S.E. Lancashire suits the industry. This climatic factor is especially important in the spinning of the finest counts, in which Lancashire excels. Thus we find that the towns chiefly noted for spinning (Oldham, Bolton, Bury, etc.) lie in exposed valleys, whilst the weaving towns (Preston, Blackburn, Darwen, etc.) are either on the drier plains or in sheltered valleys. Of course most of these towns do both spinning and weaving, but one branch of the industry usually predominates. The region is splendidly situated with regard to facilities for importing the raw cotton, three-quarters of which comes from south-east United States, and most of the rest from Egypt and India. The chief ports are Liverpool and Manchester. The importance of the Lancashire cotton trade may be indicated by the fact that about two-fifths of the cotton spindles of the world are in Lancashire. This does not mean that two-fifths of the world's raw cotton is manufactured there. As a matter of fact Lancashire only consumes about one-fifth of the world's output. The apparent discrepancy is accounted for by the fact that Lancashire manufactures very fine qualities of cotton goods. Around the cotton industry other manufactures have sprung up. Of these, bleaching, calico printing and the manufacture of cotton-making machinery are allied to the cotton trade. At St. Helens, Widnes and Runcorn, glass and chemical manufacturing, based on Lancashire coal and Cheshire salt, are carried on, whilst at Warrington and Port Sunlight (in Cheshire) there are important soap works.

Liverpool, the second port of Britain, is the great port for the cotton manufacturing region. It also exports Yorkshire woollen goods to Ireland and North America, and receives raw wool from Argentina, while it is one of the chief ports for the manufacturing areas of the Midlands. From the east-coast ports of Ireland, Liverpool imports dairy produce, which finds a ready market in the cotton manufacturing towns; from the West Indies tobacco and sugar, which are manufactured or refined locally; from North American ports, meat, wheat, timber and raw cotton; and from West African ports palm oil and kernels, rubber and ivory (see Fig. 33). *Birkenhead,* on the south bank of the Mersey opposite to Liverpool, has great shipbuilding yards. The underground railway which connects it to Liverpool was the first of its kind to be constructed in this country.

Manchester, since the construction of the Ship Canal in 1894, has been a seaport, and has a large and steadily increasing trade, especially with the West Indies and Ireland, but it has not superseded Liverpool as the chief cotton port. Manchester is really a great warehouse to which the manufactured goods from the surrounding towns are sent by road and rail for storage and sale.

The Lancashire coast watering-places, such as Southport, Blackpool and Morecambe, are conveniently situated to meet the holiday needs of the dense population in the manufacturing towns.

II. *The Cumberland Coalfield.*—This is one of the smallest of the British coalfields. It lies along the coast between Whitehaven and Maryport for a distance of about fourteen miles. The coal seams stretch out under the sea as do many of the mine workings. Some of the coal is used at *Workington* in the smelting of iron ore, but most of it is exported from *Whitehaven* and *Maryport* to Belfast, the Isle of Man and Barrow.

Barrow is in the Furness district of North Lancashire and has grown with great rapidity, for about seventy years ago it was a small village. The Furness district has rich deposits of excellent grade iron ore, known as hematite, but the local supply has to be supplemented by ore imported from abroad, especially from Spain. Barrow's chief industries are shipbuilding and the manufacture of armaments.

III. *The Northumberland and Durham Coalfield.*—This coalfield is largely engaged in the iron industry. Most

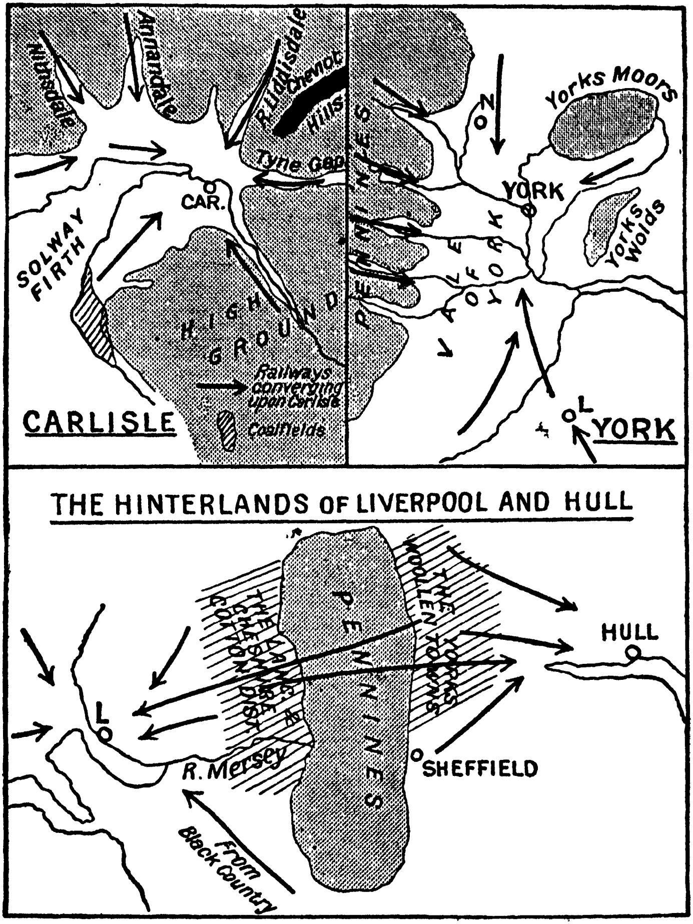


FIG. 33.—Roughly drawn sketch maps to illustrate special points, given as examples of the kind of maps which should be drawn to illustrate questions like Exercise 3 on page 184.

of the iron required is either brought by sea from the *Cleveland Hills,* outliers of the Yorkshire Moors, which produce about two-fifths of the total British output, or is imported from abroad, for only a relatively small amount of iron is now mined on the coalfield itself. Deposits of salt have led to the establishment of great chemical industries both at Middlesbrough and along the Tyne. The most important branches of the iron and steel industries are shipbuilding and general engineering (ships' engines, locomotives and railway stock, steel rails, bridges, etc.). Nearly half of the total tonnage of new English-made ships is accounted for by the ports of this coalfield. The chief yards are at *Newcastle, Jarrow,* and other towns along the lower Tyne, which has been deepened to permit of its navigation by large ocean-going ships; at *Sunderland* at the mouth of the Wear; at *West Hartlepool* north of the mouth of the Tees, and at *Stockton* on the Tees. Newcastle is also engaged in chemical industries, whilst *Darlington* is an engineering centre for the London and North-Eastern Railway, and *Middlesbrough* the great smelting centre for the iron ores of the Cleveland district.

Enormous quantities of coal are exported from this coalfield, not only by sea to London, but also to countries across the North Sea (see p. 149).

IV. *The Yorkshire, Derby and Nottingham Coalfield.* In point of output this coalfield, which extends from the Aire to the Trent, ranks first in Britain. It is mainly associated with textile and iron and steel trades. The most important feature of the British coal industry during recent years has been the sinking of new pits further east than the older mining area. Of course, these pits are very deep and the equipment has involved great expense. During 1924 the combined output of these twentieth-century collieries exceeded 11 million tons. By 1930 it is estimated that the output will have reached 20 million tons, which is equal to the whole of the 1924 output of Lancashire and Cheshire and more than half the production of Scotland. The new pits are in South Yorkshire and Nottinghamshire. See Exercise 6 on page 166.

The Yorkshire Woollen Trade.—The establishment of this important industry has been largely determined by geographical conditions. The Pennines have always been noted for sheep rearing, whilst the excellent water supply provided power and the means of cleansing and dyeing the wool, and thus assisted the early establishment of hand spinning and weaving. Later, the development of the iron and coal wealth led to the growth of great manufacturing towns where more woollen goods are manufactured than in any other district in the country. In order to meet the modern demands wool has to be imported from Australia, New Zealand, South Africa and Argentina. The centre of the industry is *Leeds,* a city specializing in ready-made clothes. It has also linen, iron and steel, and other industries. *Bradford, Halifax* and *Huddersfield* are largely engaged in manufacturing worsteds, and *Batley* and *Dewsbury* produce great quantities of "shoddy" goods, *i.e.* articles made from old woollen goods collected from all quarters and re-manufactured.

We have already learned that Liverpool is a western outlet for the exportation of Yorkshire woollen goods, and that it also receives raw wool for manufacture. The eastern ports are *Hull* and *Goole,* of which the former is by far the more important. It is the third port of Britain, and occupies an excellent position for trading with continental North Sea and Baltic ports. It imports large quantities of timber and oil seeds, and has important industries based on the latter (refining, etc.), whilst it is one of the chief towns engaged in the Dogger Bank fisheries. It is also the chief of the eastern ports shipping to continental ports the cotton goods of Lancashire (see Fig. 33).

South of the woollen manufacturing towns, and centred round *Sheffield,* famed for its cutlery, lies an engineering district producing iron and steel goods. The presence of iron and wood, the latter for smelting, made Sheffield steel goods important before the days of coal. To-day, most of the iron smelted is brought from other British iron districts as well as from Spain and Sweden. Other advantages possessed by Sheffield are the abundant supplies of limestone, the flux in smelting, of moulding sands, and of millstone grit which makes excellent grindstones. Its manufactures include cutlery, ordnance, tools, armour plate, engineering plant and machinery.

At *Derby* and *Doncaster* there are large railway engineering works, whilst at *Nottingham,* which stands on the Trent at the extreme south-east corner of the coalfield, lace and hosiery are made from cotton. Nowhere else in Britain are cotton goods manufactured in a climate which is so dry as that of Nottingham, but it must be observed that the threads used for lace and hosiery are much stronger than those used in the manufacture of Lancashire goods, hence the location of this industry in a relatively dry district.

Agricultural Areas.

The chief agricultural region is the fertile *Vale of York.* This rich plain, which is about 40 miles broad in the south and narrows to about 10 miles in the north, is one of the most fertile districts in the country. Large areas are covered either with alluvium spread out over the plain by the rivers or with boulder clay deposited there by ancient glaciers and ice sheets. Lying to the sheltered leeward side of the Pennines the region is dry and warm enough for wheat, though this cereal, except in the East Riding, is not grown to the same extent as in the Eastern Counties. Oats, barley and root crops are grown, whilst the fine grazing grounds have led to horse-rearing being important, especially in the north and east. If proof were wanted of the importance of the Vale of York even in the middle ages it may be found in the number of abbeys, monasteries and cathedrals which were established there. The chief agricultural and market centre is *York* (see Fig. 33). This city, whose site was realized to be of importance even in Roman times, is built at a convenient crossing and bridging place at the head of the tidal waters of the Ouse. It commands, (i) the routes entering the Vale of York from the south, either along the Trent via Newark and Gainsborough, or through the Lincoln gap made by the Witham in the oolitic scarp; (ii) the route from the north via the narrowest part of the plain, where stands Northallerton, an important market centre; (iii) the route from the east coast following the Derwent and the Vale of Pickering; (iv) the routes from the west following the dales of the Pennine streams. In connection with these latter routes note the line of towns—Richmond, Ripon, Harrogate (the famous spa town), Leeds, Huddersfield and Sheffield—all standing where their respective rivers leave the uplands for the plain.

Of the other eastern agricultural regions *Holderness,* formerly well-wooded, but now largely cultivated except where marshes are found, and the *Vale of Pickering* are the most important. Holderness is also noted for horse-breeding.

The lowlands west of the Pennines, *i.e.* the broad lowlands of Lancashire, the narrower Westmorland and Cumberland coastal belts and the Eden valley, are all very fertile, but, owing to the wetter climate, they are better suited for cattle-rearing than for the growing of cereals. Therefore, on the western plains dairy-farming is more important than agriculture, although root crops are produced in considerable quantities.

Sheep-farming is very important on the hill pastures of the Cumbrian Mountains, the Pennine Chain, the Cheviot Hills, the Yorkshire Moors and the Yorkshire Wolds. We have seen how this industry fostered the woollen manufacturing of the West Riding of Yorkshire. In Westmorland, where sheep-rearing is the principal industry, the abundance of wool has given Kendal a woollen manufacturing industry several hundred years old.

CHIEF ROUTES.

A very close connection exists between the relief and the lines of communication (see Fig. 34). The railway routes proceeding to Scotland pass along the plains east and west of the Pennines. The *East Coast Route* (London and North-Eastern Railway) passes through Grantham, Newark, Doncaster, York, Northallerton, Darlington, Durham, Newcastle, and proceeds to Scotland via the coastal plain of Northumberland and Berwick, without crossing the 600 feet contour line. The *West Coast Route* (London, Midland and Scottish) passes through Crewe, Warrington, Wigan (on the western margin of the Lancashire industrial region), Preston, Lancaster, Kendal, Penrith and Carlisle. This railway is therefore compelled to cross the low plateau which attaches the Cumbrian Mountains to the Pennines, a task that is not accomplished without difficulty. Another route of the L.M.S. Railway keeps to the eastern side of the Pennines until the valley of the Aire is reached. It then utilizes the Aire Gap as a means of crossing to the western side of the Pennines, and, after having negotiated the plateau mentioned

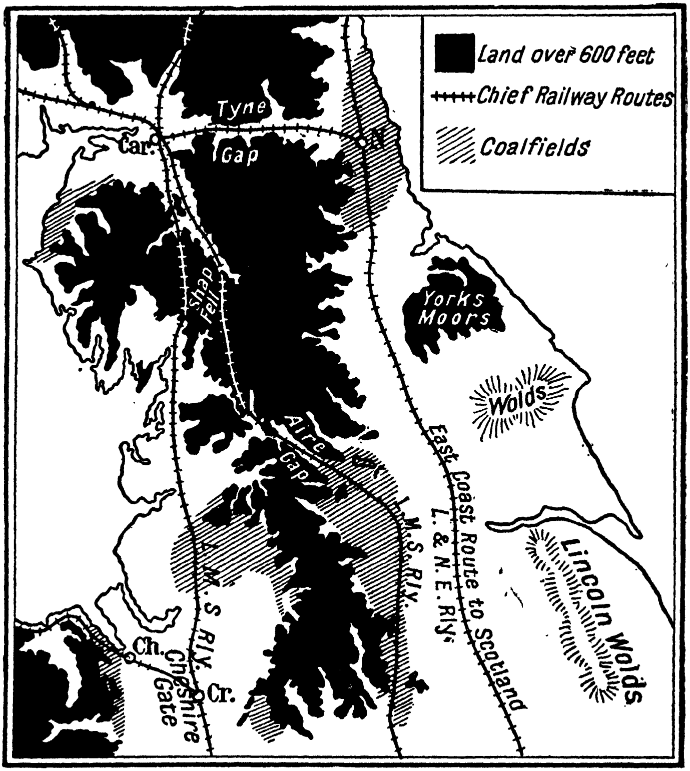


FIG. 34.—Relief, Coalfields and Routes of Northern England.

above, proceeds along the Eden valley to Carlisle. The latter city is a very important railway centre, as is shown in Fig. 33. A branch of the L. and N.-E. Railway follows the depression of the Tyne Gap and gives communication between Carlisle and Newcastle.

In all these instances we see a very close connection between routes and relief. But other important routes must be noticed, and if the control is not so obvious, it none the less exists and should be studied on large-scale maps. In almost every case the modern railway follows the older roads, and they in turn the still older pack-horse routes. The L. and Y. branch of the L.M.S. Railway connects Liverpool with Hull and Goole, and has to face steep Pennine gradients which make it necessary to employ engines capable of great haulage power. After passing through Rochdale and Todmorden, where it effects a junction with a line from the weaving towns of the Ribble valley, the main line makes use of the upper valley of the Calder and proceeds to Halifax. The line between Manchester and Huddersfield utilizes the Tame and Colne valleys. Both of these important routes are more difficult than those using the Aire and Tyne Gaps, and considerable tunnelling was necessary in their construction, but despite this they are both followed not only by roads but even by canals. A canal giving water connection between Liverpool and Leeds makes use of the Aire Gap. The railway between Sheffield and Manchester follows the Don valley, and in this case it was necessary to construct the famous Woodhead Tunnel. Further south the line from Derby traverses the beautiful Peak country by means of the Wye valley, and reaches Manchester via Buxton, Stockport and the upper Mersey. North of the Aire Gap the main L.M.S. line to the north is reached by railways from Northallerton and Darlington. The first makes use of the upper valley of the Ure (the noted Wensleydale), the second the Greta tributary of the Tees.

Besides the great ports of Liverpool, Hull, Newcastle, etc., there are several important smaller ones, such as *Fleetwood* and *Heysham*. The former is situated at the mouth of the Wyre, and has regular steamship traffic with the Isle of Man and Belfast. The latter, near Morecambe on the bay of the same name, is a L.M.S. Railway port for Belfast.

THE ISLE OF MAN.

This island lies in the Irish Sea almost equidistant from Ireland, Scotland, England and Wales. Except in the north, where there is a low alluvial plain of recent formation, the structure and relief of the island are comparable to the other highland regions which lie on the Irish Sea margins. The highest point is Snaefell (2,034 feet). The leading industries are fishing, centred at Peel on the west coast, stock-rearing and some lead-mining. The beautiful scenery and the ease of access (via Liverpool and Fleetwood) make the island a very favourite holiday centre, especially for the inhabitants of the Lancashire cotton towns, thousands of whom make their holiday headquarters at Douglas and Ramsey, but especially at the former. The Isle of Man enjoys legislative independence, and is governed by its own Parliament, the House of Keys (see also p. 183).

EXERCISES.

1. Write a geographical account of the Pennine Chain, using the following headings for sub-sections: structure and relief; climate; vegetation; industries; routes.
2. Describe the various types of scenery which would be experienced on a coastal sailing journey from Newcastle to Hull. Connect the scenery with structure and relief.
3. Account for the positions of the chief coalfields of northern England. What industries are carried on in each area? Why are these particular industries followed?
4. Make two maps of northern England, and in both shade the land over 600 feet above sea-level. On the first map shade (i) the coalfields; (ii) the chief centres of population. On the second shade to show the mean annual distribution of rainfall and mark the prevailing winds. Write descriptions of both maps.
5. Divide Yorkshire into natural regions and state the factors upon which you base your selection of regions.
6. Find out what actually happened regarding the estimates given in the third paragraph on page 160.

CHAPTER XVIII.

SCOTLAND.

Physical Divisions.

Scotland very naturally falls into three major physical divisions. These are: (1) *The Highlands,* which lie north of a line drawn from Dumbarton to Stonehaven; (2) *The Central Lowlands,* which lie between the Dumbarton–Stonehaven line and another drawn along the northern boundary of the Southern Uplands; (3) *The Southern Uplands.*

The Southern Uplands.

Physical Features.—The Southern Uplands division is a dissected plateau, tilted south-eastwards, so that most of the rivers flow in that direction, except in the east, where the Tweed and some of its tributaries flow eastwards. These Uplands are composed of very old, hard rocks (mainly ancient shales and limestones, although in the east there is a narrow band of Old Red Sandstone, stretching southwards from Dunbar to the English frontier), which have been denuded to rounded masses of approximately the same height (Broad Law 2,754 feet, Mount Merrick 2,764 feet, Hart Fell 2,651 feet, etc.). The only plains are along the coastal margins, and in the valleys of the rivers. The plains at the head of Solway Firth are separated from those in the valley of the Tweed by a ridge which attaches the Cheviot Hills to the main mass of the Southern Uplands. The Cheviots are unlike the latter, for they are mainly composed of granite and volcanic rocks. Their culminating point, the Cheviot (2,676 feet), is a mass of volcanic rock which has been laid bare by denudation. In the east of the Southern Uplands there is a series of south-west to north-east high ridges separated by deep troughs which have been cut by rivers. Thus we have the Cheviots followed by the Tweed–Teviot trough, which is succeeded by the ridge formed by the Moorfoot and Lammermuir Hills. North of this the trough of the river Esk is followed by the Pentland Hills, which are not, however, part of the Southern Upland unit.

The Border.—Before Scotland and England were united, the Border Country was the scene of constant strife. In the west the boundary line runs along the Solway Moss, now drained, but in former times offering a by no means easy crossing. In the centre the line follows the Cheviots, and in the east the Tweed. It is obvious that of the three parts of the boundary, the easiest to cross in olden days was the Tweed. Thus arose the association of a journey from England to Scotland, or from Scotland to England with the crossing of the Tweed. Thus, too, most of the border fights occurred along the eastern portion of the frontier, *e.g.* Flodden, but also note Solway Moss, both in the reign of Henry VIII. The old Roman Wall, built to keep the Picts and Scots out of England, followed the line, but not the floor, of the Tyne Gap.

Chief Occupations.—The Uplands have heather and coarse grass moors and peat mosses on their higher parts, but their lower slopes are covered with grass. Woodlands are only found in the valleys owing to the porous nature of the limestone of which most of the area is composed. The region has thus become one of the most important sheep-rearing parts of Britain. In the counties of Berwick, Selkirk and Roxburgh there are more than 1,000 sheep per 1,000 acres. The sheep-rearing industry was the means of establishing in the valley of the Tweed, where water power was available, the manufacture of the noted woollen cloths which bear the name of the river. The chief woollen towns are Peebles, Galashiels, Selkirk and Hawick. Coal, iron and machinery are now imported from the Lanark coalfield.

The coastal lowlands and the river valleys often contain alluvium and boulder clay, and are very fertile, hence the number of old abbeys whose monks cultivated the soil: *e.g.* Kelso, Melrose, Jedburgh, etc. Agriculture and dairy-farming are important occupations.

Routes.—These are of great importance, because the Uplands are a barrier set in the way of routes coming northwards from England to the Central Lowlands of Scotland, which are the most important and the most densely peopled part of the country. We have here many excellent examples of the value of coastal plains and of river valleys as means of communication (see Fig. 35). The *East Coast Route* from England crosses the Tweed, and except where it avoids the highlands of St. Abbs Head, proceeds along the narrow coast plain via Dunbar to Edinburgh. From Carlisle three routes enter Scotland (see Figs. 33 and 35). The first is owned, like the east coast route, by the L. and N.-E. Railway, and is known as the *Waverley Route,* as it traverses the country immortalized by Sir Walter Scott. Leaving Carlisle the route first follows the valley of the Liddel, and, after surmounting the ridge which attaches the Cheviots to the Southern Uplands, enters Teviotdale. From Teviotdale the line passes to the valley of the Tweed, and at Galashiels strikes along the valley of the Gala, and utilizes the gap between the Moorfoot and the Lammermuir Hills as a means of attaining the east coast plain and Edinburgh. The second route from Carlisle is that of the L. M. S. Railway. This gives the shortest route between Carlisle and Glasgow, for it will be noticed on the map that the two river valleys used by the route (Annan and Clyde) are practically in a straight line. After leaving Carlisle and rounding the head of Solway Firth the line strikes Annandale, and, leaving

Hart Fell on the right, it crosses Beattock Summit, and descends to the valley of the Clyde, leaving Leadhills, the highest permanently inhabited village in the British Isles, on the left. From *Carstairs,* an important junction, a branch line runs along the northern margins of the Pentland Hills to Edinburgh, the Glasgow line continuing along the Clyde valley to its destination. The third line from Carlisle (L. M. S. Railway) traverses the Solway lowland to *Dumfries,* the most important of several market centres standing where the routes along the coastal plain meet those coming down the river valleys of the eastern Southern Uplands. From Dumfries, the valley of the Nith, Nithdale, leads to Kilmarnock, in the Ayrshire lowland. Between

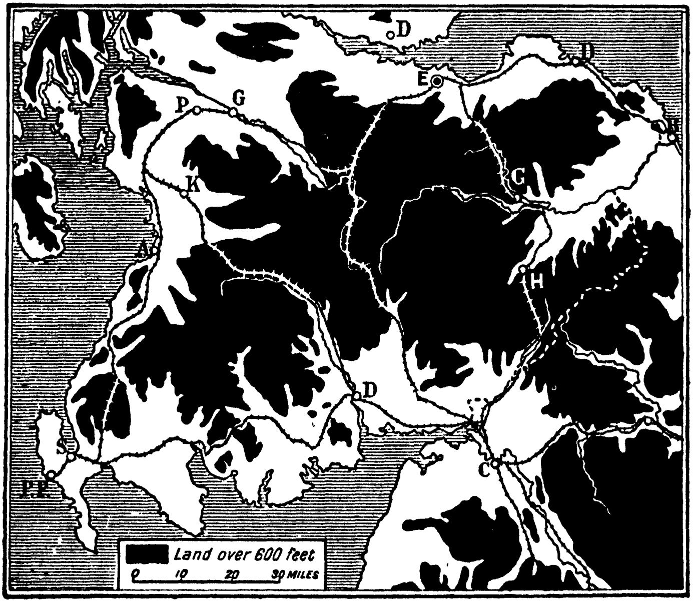


FIG. 35.—Southern Uplands. Relief and Routes.

Kilmarnock and Glasgow the line makes a great curve in order to avoid the higher ground of the Lanark Hills. Other London, Midland and Scottish lines utilize (1) the *south coast plain* for a route giving connections between Carlisle, Dumfries and Stranraer; (2) the *west coast plain* for another route giving connections between Glasgow, Ayr and Stranraer. *Stranraer* is an important port and packet station for Northern Ireland, its steamship connection with Larne giving the shortest sea passage (35 miles) between Great Britain and Ireland.

THE CENTRAL LOWLANDS.

Physical Features.—This part of Scotland is a rift valley, about 50 miles wide, let down between two parallel faults. The sinking of the ancient rocks, which before the formation of the rift valley connected the Southern Uplands with the Highlands, produced a floor upon which more recent deposits have been laid. Even these more recent deposits have been so fractured, folded and denuded that the present surface is marked by great variety both in relief and in structure. The soils derived from these various rocks have been intermingled by glacial and river action, and thus we find that many parts of the central lowlands are noted for their great fertility. South of the fault which marks the somewhat abrupt wall-like termination of the Northern Highlands, there is a long, narrow plain composed of Old Red Sandstone, and known in the east as *Strathmore* (= the great valley). South of this plain lies a line of volcanic hills parallel to the margin of the Highlands and separated from each other by broad river gaps (see Fig. 35). These hills are the Renfrew Heights, the Campsies, the Ochils and the Sidlaws. South of this line of hills we find three clearly marked basins: (1) the Ayrshire plain, (2) the basin of the Clyde, (3) the lower basin of the Forth. The importance of these basins is very great, for in them the coal measures have been preserved from denudation, whilst they have been worn off the upfolds which separate the basins from each other.

Chief Industries.—The Central Lowlands are economically the most important part of the country, and although of comparatively small area, contain about three-quarters of the total population. The reasons for this are: (i) the richness of the soil, (ii) the presence of extensive coal and iron deposits. Generally speaking, the hills are devoted to pastoral occupations and the lowlands to agriculture; but, as should be expected, there are important differences between the eastern and the western counties, due to the heavier rainfall of the latter. This makes the western counties less important for cereals and more important for pastoral pursuits than the eastern counties (see Ex. 5 at the end of this chapter). Thus, Fifeshire and Haddingtonshire grow about one-third of the total wheat crop of Scotland, whilst cattle

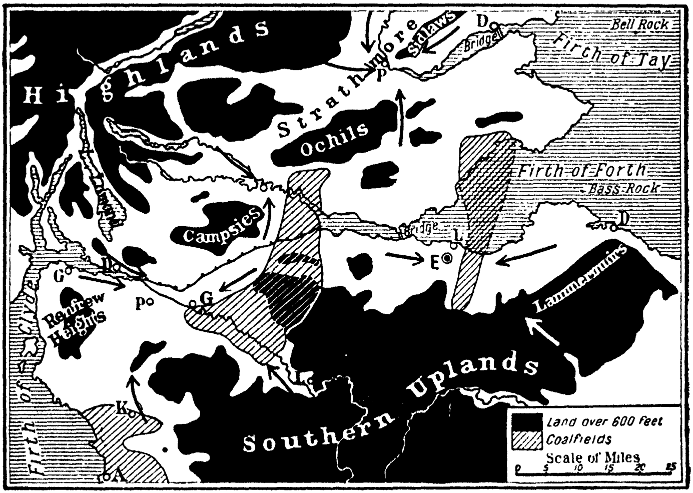


FIG. 36.—The Central Lowlands of Scotland.

are important in the west and sheep in the east. Fruit-growing is very important in Strathmore and the Carse of Gowrie. The latter region should be connected with the fruit-preserving and jam-making industry carried on at Dundee.

Of the three coalfields, the *Central or Lanark Coalfield* is the most important, for nearly half the total Scottish output is mined there. All the Scottish coalfields are noted in one direction. They have two groups of coal seams: a lower group occurring in carboniferous limestone (*cf.* the Pennine limestone), and an upper group lying in the true coal measures, *i.e.* in the same geological strata as in the English coalfields. On the central coalfield, which includes the coalfields of Stirling and Linlithgow, the presence of iron has made iron and steel trades pre-eminent. *Airdrie, Coatbridge, Motherwell,* and *Wishaw,* all in Lanark east of the Clyde, and *Falkirk* in Stirlingshire, are the great smelting and engineering centres. *Paisley,* west of Glasgow, is the centre of the cotton industry, and specializes in cotton and linen thread. *Greenock* has sugar refineries, whilst shipbuilding is carried on in the yards of *Glasgow, Port Glasgow, Dumbarton* and *Greenock.* The Clyde is now the most important shipbuilding centre in the whole world, and is responsible for the construction of nearly one-third of the total British tonnage, as well as for large numbers of ships for other countries.

The chief town of the whole coalfield is *Glasgow,* which, even before the days of coal and iron, was an important centre at the meeting-place of routes from the south, east and north. Later its favourable position for trading with the eastern shores of America made it necessary to deepen the river so as to accommodate the ocean-going ships. This was accomplished in 1768, since which date the city has grown so rapidly that it is now the third largest in the British Isles. Besides shipbuilding and steel trades, Glasgow has important chemical and pottery industries. A canal constructed in 1790 from Glasgow to Grangemouth across the narrow neck of land between the Firths of Clyde and Forth, gives the port a water outlet to the North Sea. Unfortunately, however, it is very small and can only be used by small boats. Whenever the long-talked-of ship canal is completed, it will give Glasgow an additional importance, for it will then be put into direct communication with continental Europe.

The Ayrshire Coalfield exports large quantities of coal from *Ardrossan, Troon* and *Ayr* to Belfast and other Irish towns. At *Kilmarnock,* the chief manufacturing centre, there are engineering and woollen industries.

The Eastern (*or Fife, Edinburgh and Haddington*) *Coalfield* extends under the Firth of Forth, and has until recently been of least importance, but in the future it is destined to play a greater part, for it is estimated that of the total available quantity of coal existing in the Scottish coalfields about half lies in the eastern basin. It may, therefore, not be improbable that the future will see a transference of the chief Scottish industrial region from the west to the east. In Fifeshire the chief manufacturing centres are *Dunfermline,* which makes linen goods, and *Kirkcaldy,* which manufactures oilcloth from jute, imported from India, and linoleum from cork imported from Spain. Much of the coal mined is exported from Burntisland and Methil to Norway and Baltic countries. South of the Forth there are no large industrial centres, but Edinburgh is noted for its brewing, distilling and printing trades, whilst paper-making is carried on in many of the neighbouring villages.

Dundee, the largest industrial centre in eastern Scotland, lies north of the eastern coalfield, on the north bank of the estuary of the Tay. Its industries include the manufacture of hemp, jute and coarse linen goods, fruit-preserving and jam-making (Carse of Gowrie). Hemp and flax it can readily import from Baltic countries, but the jute comes from Calcutta. It is also a shipbuilding centre and one of the headquarters of the North Sea fishing and Arctic whaling fleets. Similar industries are carried on to a smaller extent at *Arbroath* and *Montrose.*

Routes.—It is obvious from a study of a relief map that there are many towns in this part of Scotland which must be important owing to the convergence of routes upon them. Thus, *Stirling,* which is in the gap between the volcanic Campsies and Ochils, very early became important because it possessed the advantages of being at a point where the Forth could easily be bridged, and also of being at the head of the river navigation. Formerly its ancient castle, built on an isolated volcanic plug, dominated this gate to the Highlands. *Perth,* in the gap between the Ochils and the Sidlaws, has similar advantages with regard to its position on the Tay. Until the construction of the bridges across the Firths of Forth and Tay the only easy routes to the north passed through Stirling and Perth, and although the direct route to the east coast does not now pass through them, they are still "gate" cities to the Highlands. *Dumbarton,* which, like Stirling, has an ancient castle built upon an old volcanic plug, commands the routes proceeding to the north between the Campsies and the Firth of Clyde. Another important site is that of *Edinburgh.* This beautiful city grew up on the Castle rock and along the "tail" of glacial material formed behind it during the Ice Age. Between Holyrood, at the bottom of the long slope, and the castle, at the top, is the famous "Royal Mile." We have here a third example of a castle built on an isolated volcanic plug or neck. The position of the city, in the narrow plain between the Pentlands and the sea, gives it control of routes along the coastal plains, as well as of that which reaches it from the middle Tweed valley via the Gala. *Leith,* its port, and now part of the city, imports grain, esparto grass, and wood pulp for brewing, distilling and printing industries.

Leaving Edinburgh, the East Coast Route from England proceeds westwards to Queensferry, where it crosses the Forth estuary by means of the magnificent Forth Bridge, whose length is a mile and a half. On the north bank of the Forth stands Rosyth, a great naval base. The line then crosses Fifeshire, passing through Kirkcaldy and Cupar, the county town of Fife and an important agricultural centre. A branch line runs to St. Andrews, a university town, an old ecclesiastical capital, and a noted golf and holiday centre. Reaching Dundee by means of the Tay Bridge, it follows the east coast plain to Aberdeen, via Arbroath and Melrose.

THE SCOTTISH HIGHLANDS.

Physical Features.—The remainder of Scotland consists of the Highlands and the outlying island groups. The Highlands are the remnants of a plateau of ancient crystalline rock which has been dissected by rivers and profoundly modified by ice action. They are separated into the Northern Highlands and the Grampian Highlands by the long and narrow rift valley of Glen More (= great glen), three-fifths of whose floor is occupied by lakes which were artificially linked together in 1823 to form the Caledonian Canal. Everywhere the evidences of ice action are manifest. Scratched and polished rocks abound; most of the lakes have been made, either by the damming of a valley by the placing of morainic material across the course of a river, or by the scooping out of rock basins, whilst the west coast abounds in fiords, called firths or lochs, made by the sinking of former river valleys which had been deepened by glaciation. There is a great contrast between the west and east coasts of Scotland—not merely in relief and structure, the one a bold rugged region of ancient hard rock, the other largely a plain of Old Red Sandstone, but also, as the result of those differences, in climate and in economic activities.

It will be noticed that in both the Northern and the Grampian Highlands the ancient plateau from which they have been formed was roughly tilted towards the south-east. This is seen by the trend of the river valleys. In the Grampian Highlands, however, there are a number of well-marked valleys running at right angles to this direction, *e.g.* Findhorn, Spey and Upper Tay. In the

Southern Uplands we noticed a similar feature in the eastern part of that region. In both cases the rivers have cut their valleys in less resistant rocks, which appear at the surface in long N.E.-S.W. bands or belts. The whole of the Highlands, as we have said, consists of old hard rock, but some measures are harder than others, *e.g.* those of the belt of mountains stretching from Ben Nevis (4,406 feet) to Cairn Gorm (4,084 feet). This north-east to south-west trend of the "graining" of the rocks is a very prominent feature in British topography.

The main watershed is comparatively close to the west coast, so that the longer and more useful rivers flow eastwards or south-eastwards, but only one or two are of value for navigation, and then only in their lower courses for small boats, owing to their steep gradients. Many of them, particularly "the thundering Spey," are noted for their salmon fishing, whilst some are of great value in giving routes into the Highlands.

The prevailing highland landscape consists of treeless moors, covered by peat bogs, heather, bracken and poor grass, above which tower the rounded mountains whose higher slopes and summits are almost, if not quite, devoid of vegetation. In the river valleys or glens there is a greater variety of vegetation, and coniferous and deciduous trees are found. There, the graceful silver birch, the beautiful lakes, the rushing, peat-coloured rivers, and the gorgeous colours of the ferns, mosses, heather and flowers, give such magnificent scenery that they are visited by thousands of tourists, who form one of the chief sources of revenue in a land not otherwise richly endowed by nature. The best-known region is the *Trossachs,* immortalized by Scott in his poem, "The Lady of the Lake." It is situated around Loch Katrine, in south-west Perthshire.

Chief Occupations.—There is a great contrast between the east coast plain and the rest of the Highlands. The plain, which is composed of relatively soft Old Red Sandstone, except where the Grampians reach the coast in Aberdeenshire and Banffshire, has fertile soil, warm summers and a moderate rainfall, so that it is favourable to agriculture. Oats and barley are grown, and large numbers of cattle are reared. In the mountainous parts the low temperature of the exposed high moorlands, the poverty of the natural vegetation, and the thinness and barrenness of the soil, make the Highlands of small economic value, for they are unsuitable for agriculture and of little value for pastoral purposes. Neither sheep nor cattle are really at home on the Highland pastures, and although both are reared, their numbers per 1,000 acres are less than the average for the British Isles. The Highland peasants, or crofters, cultivate small patches of root-crops and oats, and rear sheep and the shaggy-coated, long-horned, highland cattle, as well as hardy mountain ponies. But both men and domesticated animals are decreasing in numbers, and more and more cultivated land is becoming permanent pasture, not, however, for cattle or sheep, but for deer.

In several parts of the Western Highlands ambitious schemes are being carried out by means of which water from Highland lakes will be used to generate cheap electrical power. In some instances the water has been led through long tunnels cut through the mountains, as for example the 15-mile tunnel through the Ben Nevis range near Fort William. In this instance the power is being used in the manufacture of aluminium.

Round the coasts fishing is everywhere an important occupation, but is naturally chiefly carried on from east coast ports which face the North Sea fishing grounds. The East Coast plain has not only a large population, but easier railway facilities for dispatching the fish to the populous lowlands. Wick, Peterhead and Aberdeen are the leading fishing centres, the last-named being only second in importance to Grimsby as a trawl-fishing centre. Kyle of Lochalsh and Mallaig, both on the west coast, receive the catch from the Western Isles for dispatch by rail to the east coast or the Central Lowlands.

At Aberdeen and Peterhead the quarrying of granite is an important industry. The quarries are close to the sea, so that the granite can be cheaply shipped to east coast towns.

Routes and Cities.—The east coast plain is followed

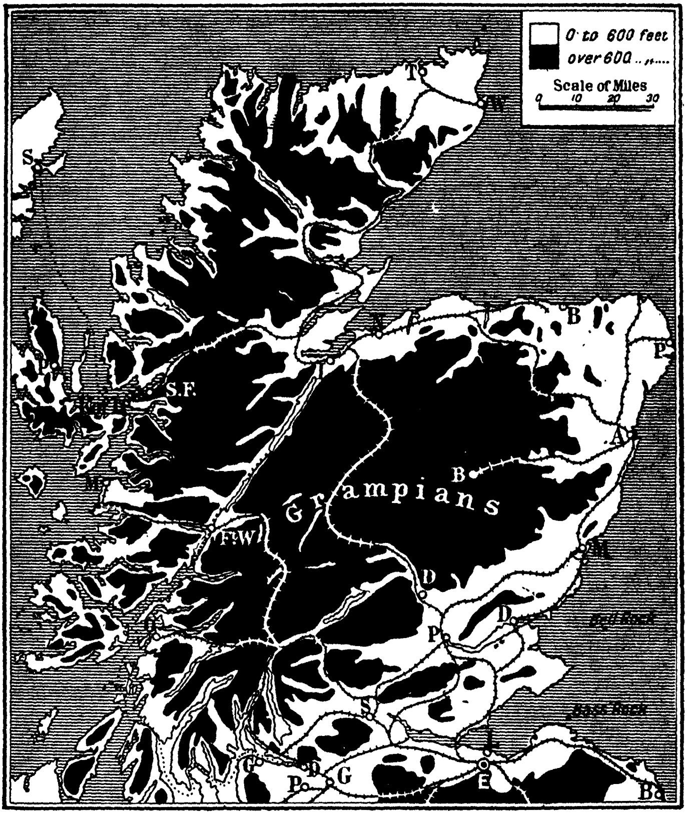


Fig. 37.—The Highlands. Relief and Routes.

by railway from Dundee to Aberdeen (see Fig. 37). *Aberdeen* stands between the mouths of the Dee and the Don, and has a fine harbour protected by breakwaters, at the mouth of the former river. It thus commands the traffic up and down these valleys and that passing along the coastal plain, whilst it is in a very favourable position for engaging in the Dogger Bank fisheries. It is also a university city and an important cattle market and quarrying centre. A branch line follows the Dee as far as Ballater, from which coaches run to Balmoral, the favourite royal residence in the Highlands. Leaving Aberdeen the main line does not follow the coast of the low, blunt Buchan peninsula, but utilizes the Don and other valleys to take a short cut to Elgin. *Peterhead* has granite and fishing industries. From Elgin the main line continues via Nairn to Inverness, often called the Capital of the Highlands. *Nairn, Elgin,* noted for its ruined cathedral, *Banff* and *Fraserburgh* are all small fishing and market centres. From Elgin a branch line runs to Lossiemouth.

Inverness (= mouth of Ness) occupies a splendid position where several routes meet, and is thus of considerable importance. It commands routes from (i) the east via the coast plain, (ii) the south-east, from Perth via the Drumochter Pass and the Spey (Highland Railway), (iii) the south-west, via the road and the Caledonian Canal, (iv) Wick and the north via the coast plain. It has also access along the Moray Firth to the North Sea. Throughout the whole of Scottish history the fertile Moray Firth lowlands, for which it is the centre, have played a very important part. Leaving Inverness the east coast line proceeds through Dingwall, at the head of Cromarty Firth, and at Bonar Bridge, at the head of Dornoch Firth, leaves the coast, to which it soon returns, however, at Golspie. At Helmsdale it again strikes inland along the valley of the Helmsdale river, and finally reaches the coast at the fishing ports of Thurso and Wick.

Perhaps the finest views obtainable in Britain from a railway carriage window are to be seen on the Highland Railway between Perth and Inverness. Leaving Perth this line follows the valley of the Tay and its tributary the Garry, and thus traverses some of the finest parts of the Grampians. It goes through the narrow Pass of Killiecrankie, and later has to surmount the great mountain barrier extending from Ben Nevis to Cairn Gorm. This it does by means of the Drumochter Pass (1,500 feet), which gives access to the upper Spey valley. Leaving the Spey, the line rounds the Monadhliath Mountains, which lie between the Spey and Glenmore, and cutting across the Findhorn and Nairn valleys finally reaches Inverness.

The west coast is reached by railways at several points. The most northerly point is at the fishing port of Kyle of Lochalsh, which is connected with Dingwall on the east coast by a line making use of one of the many long north-east to south-west valleys. Between Kyle of Lochalsh and Thurso no railway reaches the west or north coast. Other lines reach the west coast at *Mallaig,* which like Kyle of Lochalsh is a fishing port depending very largely upon the fast trains which carry the fish to the populous centres, and at the tourist centre of *Oban,* the largest town on the west coast of the Highlands. For most purposes the land routes from Glasgow to Oban and other west coast towns are so difficult that the sea route is largely adopted. This is shortened by the Crinan Canal, cut through a depression at the head of the Kintyre peninsula.

The importance of Glenmore and of the Caledonian Canal which traverses it, is lessened by the fact that it does not connect large centres of population. When the canal was built it was hoped that it would do much to check the depopulation of the Highlands, but it has not had this effect and is now chiefly used by small tourist vessels. It is not even followed by a railway throughout its whole length.

The Isles of Scotland.

The isles of Scotland may be divided into four groups: (i) The Orkneys and Shetlands, (ii) the Outer Hebrides,

(iii) the Inner Hebrides, (iv) the islands of the Firth of Clyde.

The Orkneys and Shetlands.—The Orkneys are separated from the mainland by the Pentland Firth, through which the tidal waves form a strong *race* which is a danger to shipping. Like Caithness, the Orkneys are composed of Old Red Sandstone arranged in horizontal layers. The sea has cut back both the mainland and the islands, so that in many places there are high perpendicular cliffs. One isolated stack, known as the Old Man of Hoy, is about 600 feet high. On the whole, however, the Orkneys are low. The Shetlands consist of old, hard, crystalline rocks like the Highlands, and are bold and rugged. Sheep and pony rearing in the Shetlands and cattle rearing in the Orkneys, agriculture in the Orkneys, and fishing in both, are the leading occupations. *Kirkwall,* on Mainland, the largest of the Orkneys, is a steam-trawling centre. *Lerwick,* on Mainland, the largest of the Shetlands, is also a fishing centre. The Great European War gave to these groups of islands a considerable strategic importance, for they formed one of the chief bases of the British Fleet engaged in blockading the broad northern entrances to the North Sea. They are stepping-stones to Norway, and are remnants of a former highland mass which stretched from Britain to Scandinavia.

The Outer Hebrides.—These islands are separated from Skye and the mainland by the Little Minch and the North Minch. They have the appearance of a kite with a long, straggling tail. Geologically they are the remnants of some of the oldest rocks on the earth's surface, and although they have been worn down to a rough plain, or peneplain, they are not fertile. Their surface is studded by many bogs and lakes, most of the latter being due to the action of ice sheets. The islands act as a natural breakwater, so that the enclosed seas are relatively calm and abound in fish. Fishing is the chief industry of the inhabitants, and Stornoway in Lewis is the centre of the industry. The fish are sent to Kyle of Lochalsh, from whence they are hurried to the markets by rail. Agricultural and pastoral pursuits are followed to a limited extent.

The Inner Hebrides.—In these islands, which stretch from Skye to Islay, the ancient rock has been largely covered by great sheets of basalt, a volcanic rock, which in a liquid state probably flowed considerable distances before cooling. When cooling occurred, however, it took place rapidly, and the resulting contraction produced the famous columnar structure seen in the Isle of Staffa at Fingal's Cave and at Giant's Causeway in north-eastern Ireland. It is believed that long ago the streets of basalt which now cover most of the Inner Hebrides, formed, with the sheet covering Antrim, one vast continuous mass.

The industries of the Inner Hebrides resemble those of the Outer Hebrides. *Portree,* in Skye, is a small fishing centre. The fish are sent to the eastern and southern markets, from Kyle of Lochalsh and Mallaig.

The Islands in the Firth of Clyde.—These are the islands of Bute and Arran, which form the county of Bute. Many geological formations are represented, but Goat Fell (2,866 feet), in Arran, is composed of granite. The islands are not very productive, but are popular holiday resorts. *Rothesay,* standing on a beautiful bay in the Kyles of Bute, the strait between Bute and the mainland, is the most important town.

The tide of early Scandinavian conquest by sea gradually spread along the island stepping-stones of the Faröes, Shetlands and Orkneys; and thence after the rounding of Cape Wrath (the corner cape), via the Outer and Inner Hebrides, to the Isle of Man, which came under Norwegian rule at the end of the ninth century. The Isle of Man and the Hebrides remained Norwegian until 1266, when they became Scottish, but Scotland did not obtain possession of the Orkneys and the Shetlands until 1468. It is, therefore, not to be wondered at that the Scandinavian element in the latter islands is still strong.

EXERCISES.

1. Into what three natural divisions may Scotland be divided? What are the leading physical characteristics of each?

2. Describe a railway journey from Carlisle to Inverness in such a way as to bring out (i) a description of the scenery, (ii) the relation of route to relief.

3. Read the account of the position of Edinburgh on page 175 and draw a sketch map which illustrates the points mentioned.

4. Show how far the following cities owe their importance to geographical factors: Stirling, Inverness, Aberdeen, Berwick, Dumfries, Perth. Draw sketch maps to illustrate your answer. (See Fig. 33.)

5. On an outline map of Scotland shade the land over 600 feet. On the same map mark the coalfields, and also shade the map to show the distribution of the population according to the following index: wide dots where the population is very small: *i.e.* less than 50 per square mile; horizontal lines from 50 to 250; and horizontal and vertical lines for over 250. Account for the facts brought out by this combination of data.

6. WESTERN COUNTIES.

County.	Cultivated Land per 1000 acres.	Wheat Land per 1000 acres.	Sheep per 1000 acres.	Cattle per 1000 acres.
Ayr . . .	208	1	490	141
Renfrew . .	271	12	281	165

EASTERN COUNTIES.

County.	Cultivated Land per 1000 acres.	Wheat Land per 1000 acres.	Sheep per 1000 acres.	Cattle per 1000 acres.
Haddington . .	532	37	742	57
Edinburgh . .	364	21	770	87

What differences between the western and eastern counties of the Central Lowlands do these figures illustrate? Account for them.

CHAPTER XIX.

IRELAND.

Ireland, which is rather larger than Scotland, is separated from Great Britain by the North Channel, the Irish Sea, and the St. George's Channel. But Ireland was not always physically separated from Great Britain, for to a large extent her structural divisions are clearly prolongations of those of her neighbour (see Fig. 25). For example, the rocks of the Southern Uplands are seen in the Mourne Mountains area, and again rise above the level of the plain in the Slieve Blooms. The old, hard rocks of north-western and western Ireland are prolongations of those of north-western Scotland. The volcanic plateau of Antrim resembles the Inner Hebrides, whilst the south-eastern mountains are extensions of those of north and central Wales, and the south-western mountains find their counterpart in southern Wales and the English south-western peninsula.

The general relief of Ireland (see Fig. 38), with its extensive central plain ringed about by more or less isolated groups of mountains, between which the plain reaches the coasts in many places, makes it much more difficult to divide the country into physical units than in the case of Great Britain. In England, Wales and Scotland the presence of high watersheds and of well-defined systems of river drainage make this a comparatively easy task. For the purposes of this chapter it is necessary, however, to consider Ireland under several physical units, and not to treat it as a single unit, which a moment's study of a physical map will show it is

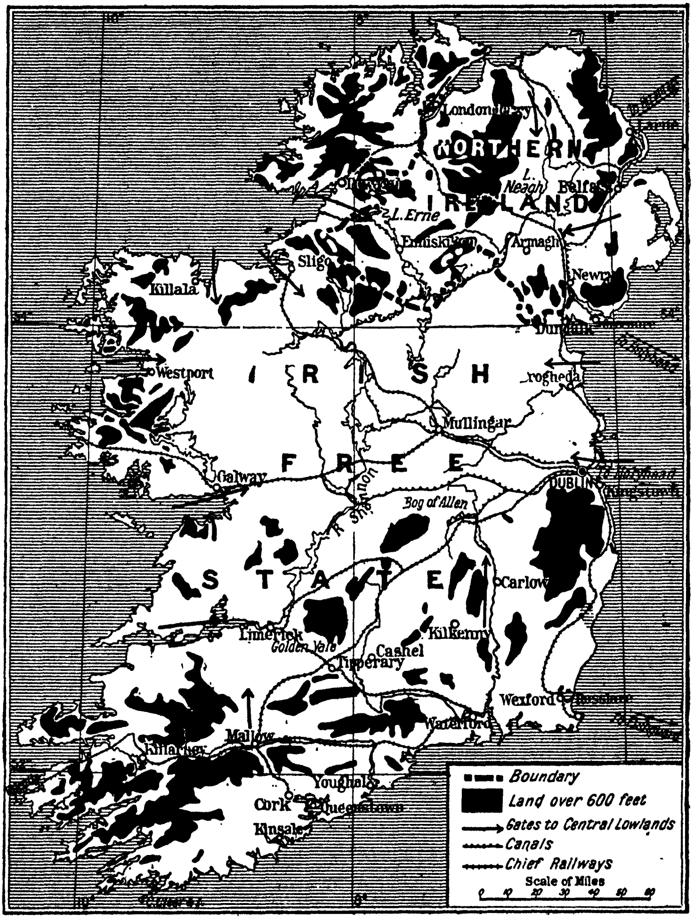


FIG. 38.—Ireland. Relief and Routes.

not. We shall therefore take the following: (1) *The Central Plain;* (2) *The Highlands of Western Connaught;* (3) *Northern Ireland,* noting the contrasts between north-east and north-west; (4) *Southern Ire-*

land, noting the contrast between south-west and south-east.

THE CENTRAL PLAIN.

Physical Features.—The Central Plain of Ireland covers about one-third of the total surface, and is composed of sheets of carboniferous limestone (see Fig. 25) which have been practically undisturbed. It will be recalled that the Pennine Chain is built of the same rock, but in its case the limestone and the measures above it have been thrown into a great fold. It is very probable that the Central Plain of Ireland was also formerly covered by layers of rocks belonging to the coal measures. These, however, have been denuded by rivers and carried away except in one or two small basins. But the surface does not by any means present a perfectly flat appearance. It is gently undulating, the lowest land being in the river valleys, and although most of the water-partings exceed 250 feet there are only a few places where 500 feet is exceeded. The limestone is covered by an almost continuous sheet of boulder clay deposited by the ice sheets which once covered the land. The clay deposits are, however, not so prevalent west of the Shannon as in the eastern part of the plain, and therefore the western plain is poorer and less fertile. The surface of the Central Plain is dotted by small, moraine-dammed lakes, but most of the large lakes occupy hollows produced by the solution of the limestone.

Bogs.—One-eighth of the total area of Ireland is covered by bogs, of which the largest and best known is the Bog of Allen, chiefly in King's County east of the Shannon. Bogs are soft, saturated and spongy areas in which much decaying and decayed vegetable matter is present. They form in shallow, stagnant lakes or on cold, damp, mountain surfaces. In the former places they are largely produced by sphagnum, a moss which will in time cover the whole surface of the lake, and finally fill it with decayed or decaying vegetation which assumes the appearance of a stiff fibrous mud. This is called peat. The peat is cut into brick-shaped pieces, which are stacked until dry enough to be used as fuel whose heating power is about half that of coal. Peat is also used as a constituent in the manufacture of manures. In an almost coal-less country like Ireland peat is naturally extensively used for fuel.

One drawback of the bogs is the great hindrance they present to means of communication, for all main roads and railways must either avoid them or be built upon causeways resting on the solid rock below the bog. As this is frequently from 20 to 50 feet below the bog surface, the construction of roads and railways is a very extensive undertaking.

The hill-side bogs are liable to become swollen after heavy rains. This causes them to burst and to slide towards the valleys, often causing much loss of property and even of life.

The Shannon.—This river is the longest in the British Isles, but its importance is not very great, as it does not flow through populous districts, and its estuary opens to the west coast away from the sister isle of Great Britain, the market for most Irish products. Between Loughs Allen and Derg the change of level is so slight that the river only falls 60 feet in 80 miles, and therefore lazily ambles its way along the plain; but between Lough Derg and Limerick it cuts its way through a gorge at Killaloe, falling 100 feet in less than 20 miles. This forms a series of rapids which impede through navigation. A canal built round the rapids, however, surmounts this impediment and renders the Shannon navigable for river boats for about 200 miles, while a great hydro-electric project, the *Shannon Power Scheme,* has recently been completed at Ardnacrusha, which makes use of the force of the water to create cheap power and light which is being distributed over wide areas of the Free State.

The western boundary of the plain is marked by the chain formed by Lakes Conn, Mask and Corrib. The two last-named lakes are connected by an underground channel. The eastern part of the plain slopes to the

Irish Sea, and is largely drained by the Boyne and the Liffey.

Chief Occupations.—Pastoral occupations are everywhere of greater importance than the tillage of the land. Not one-tenth of the whole is cultivated, but the percentage is greater in the drier east than in the wetter west. Oats and barley are the chief cereals, whilst the growing of potatoes is widespread, especially in the west. The rich permanent pastures support large numbers of dairy cattle, and the rearing of pigs, fed on skimmed milk and potatoes, is also very important. A ready market for butter, cheese, eggs, bacon, etc. is found in the industrial areas of Great Britain.

The Routes and Towns.—The most important routes are those which reach the east coast where the plain extends the whole of the distance between the Wicklow Mountains to the south and the Mourne Mountains to the north. The reason for this is fairly obvious if the map is consulted, for on the one hand the east coast faces Great Britain, and on the other the great plain of England reaches the Irish Sea opposite the coastal extension of the Central Plain, a fact that has had no small influence upon history.

Dublin, standing on the Liffey at the head of Dublin Bay, occupies an excellent site, not only for a capital city, but also for the development of trade with Great Britain (see Fig. 38). Its excellent railway and road communications with all parts of the country, and its canal connections with the Shannon (the Royal Canal via Mullingar to a point north of Lough Ree, and the Grand Canal via Tullamore to a point about midway between Loughs Ree and Derg), have made it at once the great collecting centre of the produce of the eastern Central Plain and the distributor to the same region of articles imported from Great Britain. Its position opposite Anglesey gives it the advantage of the shortest sea passage to England, whilst the large populations of the industrial districts of S.E. Lancashire and the Midlands form the chief markets for its exports. Dublin has also important brewing, distilling and poplin manufacturing industries. *Kingstown* is an outport of Dublin, and is the port for the mail steamers to Holyhead. *Drogheda* on the Boyne, and *Dundalk* on the bay of the same name, are also ports for the produce of the Central Plains, whilst both have linen and other manufactures. *Greenore,* near the entrance to Carlingford Lough, is a packet-station having connections with Holyhead. It forms the outlet for the small linen manufacturing towns and the agricultural district of the basin of Lough Neagh.

Athlone, on the Shannon, just south of Lough Ree, stands at an important crossing point, for the Shannon is generally broad enough to form an effective barrier. The railway from Dublin crosses there on its way to *Galway,* a port which has declined in importance owing to the dwindling away of its former large trade with Spain. *Limerick,* at the head of the Shannon estuary, is the chief port of Western Ireland. If it had a rich industrial region for its hinterland it would undoubtedly be a port of first-class importance. Its hinterland, which includes the *Golden Vale,* a rich agricultural region stretching south-eastwards from Limerick to the upper basin of the Suir, as well as the basin of the Shannon, is chiefly pastoral. This accounts for the bacon-curing and tanning industries centred in the port, and for the large consignments of cattle and dairy produce exported to Great Britain. Lace-making is also carried on. *Sligo* stands where the plain reaches the sea between the mountains of Western and of North-western Ireland. It exports cattle and dairy produce.

The Highlands of Western Connaught.

These highlands lie west of the Loughs Conn, Mask and Corrib chain of lakes, and like those of North-western Ireland, repeat the leading characteristics of the Scottish Highlands; but it must be noted that the Scottish Highlands are both more extensive and higher than their Irish counterparts. It is on account of the more broken character of the Irish mountains, and the relatively broad lowlands which separate them, that towns are more numerous and a larger number of people are supported than in the Scottish Highlands. The picturesque Connemara Mountains are separated from the Nephin Beg or Mayo Mountains by Clew Bay. West of the Mayo Mountains lies the lofty Achill Island, the largest in Ireland. Achill Island terminates on the west, in the narrow ridge of Achill Head, which rises from the sea to a height exceeding 2,000 feet.

This part of Ireland is the poorest in the country. Its population is very small, and has been decreased by emigration. Pastoral occupations are carried on in the lowlands, and many cattle and pigs are raised, whilst some sheep are pastured in the highlands. The magnificent scenery of the Connaught and Donegal coasts has led to the region being visited by an increasing number of visitors, who form, although not to the same extent as in the Scottish Highlands, one source of revenue. Extensive fisheries are not developed owing to distance from markets.

Westport, on Clew Bay, and *Killala* are small ports standing at the sea end of belts of lowlands which act as gates to the Central Plains (see Fig. 38).

NORTHERN IRELAND.

Physical Features.—Northern Ireland consists of highland blocks separated by belts of lowland drained by rivers. On structural grounds northern Ireland may be divided into a western part, where the N.E.–S.W. direction of the mountains and their crystalline and granitic character show them to be outliers of the Scottish Highlands, and an eastern part, where the lava-topped basalt plateau of Antrim has connections with the Inner Hebrides (see p. 183). The broad lowland of the river Bann separates the two regions. Lough Neagh (area 150 sq. miles), the largest lake in the United

Kingdom, occupies a shallow basin, probably produced by the sinking of part of the basalt sheets. Note the number of streams draining into it. The soils produced by the disintegration of the volcanic rock are very fertile, and have helped to make the lowlands of the Bann and

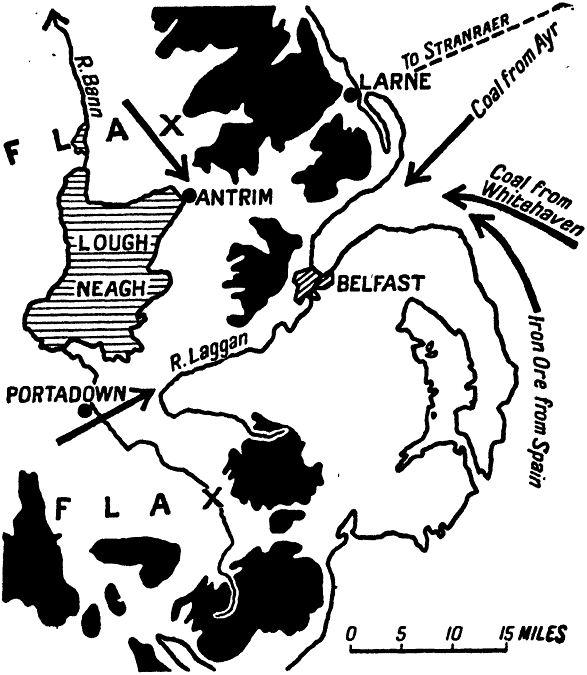


FIG. 39.—The position of Belfast.

those surrounding Lough Neagh one of the best agricultural areas in the country, but the soils derived from the old, hard rocks of the west, as well as from those of south-east Ulster, where the ancient limestones of the Southern Uplands of Scotland reappear, are generally poor, and pastoral occupations predominate.

Chief Occupations.—North-eastern Ulster, the northern province, contains the most prosperous agricultural and industrial centres of the country. This is partly attributable to the considerable number of Scottish and English settlers who took up their residence in Ulster in the plantation days of the sixteenth and seventeenth centuries, a series of historical events which have ever since profoundly disturbed the Irish political situation.

Ulster grows about one-half of all the oats produced in Ireland, and practically the whole of the flax. Dairy-farming and pig-keeping are carried on in all the lowlands and some sheep are reared on the hill pastures.

The most important industrial region in Ireland is Eastern Ulster. Here the great shipbuilding yards of Belfast, and the linen mills of Belfast and other centres, have developed without the aid of local coal and iron, for the output from the coal-mines at Dungannon, south-west of Lough Neagh, is very small indeed. Against these disadvantages must be placed the advantages of cheap land and an abundant supply of labour. Coal is imported from Ayrshire, Cumberland and Lancashire, and iron and steel from many parts of Britain, but most conveniently from the Barrow and Cumberland iron districts. Belfast is particularly noted for the building of large passenger ships, and in its yards many of the world's largest vessels have been built. The manufacture of linen goods is naturally associated with the Ulster cultivation of flax, but the mills now obtain most of their supplies from Belgium and other foreign countries. Belfast has become the great centre of the trade for several reasons. Its climate and its water supply are especially suited for the bleaching of linen; its shipbuilding industry, being almost entirely a man's occupation, provides a large reservoir of female labour available for the manufacture of linen goods, whilst being a port it can readily receive raw materials from Great Britain or from foreign countries. The city has also important distilling and rope-making industries.

Londonderry has shipbuilding, rope-making and linen industries, but on a much smaller scale than Belfast. It is particularly noted for shirts. In Donegal, as in the Scottish Outer Hebrides, the hand-weaving of wool provides many people with the means of livelihood.

Routes and Towns.—The main roads and railways avoid the highlands and follow the river lowlands. Notice a group of towns which control the various "gateways" leading to the Lough Neagh lowlands. Belfast and Larne, the port for Stranraer, stand at the eastern gate; Coleraine and Portrush (near the famous Giant's Causeway) are at the northern gate; Monaghan and Armagh control the south-western gate; and Newry and Greenore, the packet station for Holyhead, command the south-eastern gate. Round the Lough itself are several small but important local market centres. Londonderry and Moville, the latter a port of call for steamers sailing between America and Glasgow, command the Foyle route to and from the central plains. Ballyshannon stands at the sea end of the routes following the Erne; whilst Enniskillen, situated between upper and lower Loughs Erne, commands an important crossing point. Belfast is connected to the upper Shannon by canal and river routes, via the Lagan, Lough Neagh, the Blackwater, the Ulster Canal, upper Lough Erne and the Shannon Canal. The Newry Canal gives through water communication between Lough Neagh and Carlingford Lough.

Belfast is the chief industrial and commercial city of Ireland and the capital of Northern Ireland. Its shipbuilding, linen, distilling and rope-making industries have been referred to. It has steamship connections with most of the ports on the central part of the west coast of Great Britain, those with Glasgow and Liverpool being of chief importance.

Londonderry, the second city in Ulster, has shipbuilding, linen and rope-making industries. *Armagh,* south-west of Lough Neagh, is the ecclesiastical capital of the Episcopal Church of Ireland, and is the seat of an Archbishopric. Like most of the towns of Eastern Ulster it manufactures linen goods.

SOUTHERN IRELAND.

Physical Features.—On the whole, Southern Ireland is mountainous, with lowlands bordering the rivers and the coasts. It can be divided into two structural units, the south-west, lying west of the Suir, and the south-east.

In the south-west the east-and-west direction of the Old Red Sandstone mountain ridges resembles South Wales. At the northern base of the highest ridge, the MacGillycuddy's Reeks, lie the beautiful Lakes of Killarney, overlooked by Carrantual (3,414 feet), the highest peak in Ireland. Along the south-west coast, the valleys between the parallel ridges have been drowned, forming a magnificent series of inlets, of which the chief are Dingle Bay, Kenmare River and Bantry Bay. Inlets like these are called *rias,* those which have been deeply glaciated prior to subsidence are known as *fiords.*

Two small islands off the coast of south-west Ireland are of considerable importance. *Valentia Island,* at the entrance to Dingle Bay, is the terminus of the earliest and of several subsequent telegraph cables to North America. It is also the most westerly of the British Meteorological stations, and therefore has a special importance in the making of British Weather Reports, because, except for ships at sea, it is the first to announce the approach of storms, which largely come from the west. *Clear Island* is an important lighthouse and signalling station engaged in reporting the movements of Atlantic vessels.

In South-eastern Ireland the mountains have the same N.E.–S.W. direction as in the west and north-west, but the general direction of the rivers is from north to south (*e.g.* Nore, Barrow and Slaney). The rocks resemble those of the other "corner blocks" of the Irish Sea, the Mourne Mountains, the Southern Uplands and the Welsh Mountains. They are largely ancient sedimentary rocks with great masses of granite in the central areas. The Wicklow Mountains in particular are largely composed of granite, which rises into dome-shaped summits. Their valley forests and extensive areas of bog give them many points of resemblance to Dartmoor in South-western England.

Chief Occupations.—In the south-west the range of temperature is very small and the winters as mild as those of the Mediterranean lands. The rainfall is abundant, so that the grass grows all the year round. Therefore pastoral occupations, particularly dairy-farming and pig-rearing, are more important than agriculture, and are carried on in all the richer lands of the river valleys. In the highlands there are very few people, for life there is very hard owing to the thinness and poorness of the soil and the more severe weather conditions. Some fishing is carried on off the coasts, particularly for mackerel.

In the south-east the drier climate and the greater extent of lowlands make it possible for more agriculture to be carried on than in the south-west, but dairy-farming is still the most important occupation. Barley is extensively grown, and has led to the development of brewing industries at Waterford and Kilkenny. The upper valley of the Suir forms part of the Golden Vale, where mixed soils derived from Old Red Sandstone and Limestone are very fertile. This is the only part of Ireland where wheat-growing is important. Some coal is mined near to Kilkenny, and also in northern Kerry, but the output is small and the coal is not of good quality.

Routes and Towns.—In the south-west the roads and railways take the east and west direction of the valleys, *e.g.* the railway line from Waterford to Killarney. Notice the parallel courses of the Bandon, Lee and Blackwater, and also that each river turns south to its drowned mouth on rounding the eastern end of the mountains. Kinsale on the Bandon, Cork on the Lee, and Youghal on the Blackwater, are the outlets for the dairy produce of their respective river valleys. *Cork* is the largest and most important town in Southern Ireland. Pigs are slaughtered and cured for bacon, milk is condensed, and live cattle and enormous quantities of butter, cheese and eggs are exported to Great Britain, especially to Bristol. *Queens-*

town, on an island in Cork Harbour, is a port of call for American mail and passenger steamers, although some of the largest liners do not now call there on the homeward-bound journey. Queenstown is connected to Dublin by a very important mail line (see Fig. 38).

The outlets for the rich vales of Suir, Barrow and Slaney are *Waterford* and *Wexford.* The former stands some distance inland on Waterford Harbour. It exports great quantities of dairy produce, bacon, eggs and live cattle to England. Wexford is a smaller port with similar exports. Both have been superseded as passenger ports by *Rosslare* in south-east Wexford, the Great Western Railway mail and passenger port with fast steamship connections with Fishguard in Pembroke. The chief inland agricultural centres are *Tipperary, Cashel* and *Clonmel* (all three in the Golden Vale), *Kilkenny* (on the Nore), and *Carlow* (on the Barrow). From the earliest times the fertile valleys of S.E. Ireland have been of greatest importance. Cashel was the capital of the old Kings of Munster, whilst the valleys of the Nore, Barrow and Slaney formed the richest parts of the powerful kingdom of Leinster. The large number of ruined castles, abbeys and monasteries also bear testimony to their agricultural wealth.

The upper Barrow is connected by canal to the Grand Canal, and therefore with Dublin, which is the natural outlet for the products of that part of the basin.

THE GOVERNMENT OF IRELAND.

Because Ireland is an island, its separation from England is more complete than in the case of Wales and Scotland. The separation has also had the influence of creating greater differences between the Irish and the English than between the latter, on the one hand, and the Welsh and the Scots on the other. A large number of Irishmen feel themselves to be a distinct nation, and many of them have kept their own language and have handed down from generation to generation ideas of political freedom from England. But the whole of the people of Ireland do not hold these ideals, for in the north-east, where the principal industrial area is situated, the descendants of Scottish and English settlers are in the majority.

For very many years the population of Ireland has been declining. In 1841 there were nearly 8¼ million inhabitants; in 1926, the last census, there were only 4,228,000. Large numbers have emigrated, principally to the United States, where it is said there are four times as many Irish people as in Ireland. Many causes contributed to this decline in the population besides the desire for self-government. Ireland, unlike her neighbours in Great Britain, is practically without that mineral wealth which, in modern times, is necessary for the growth of great manufacturing industries, while the presence of extensive bog-lands and the dampness of the climate limit agricultural development.

In order, if possible, to give peace and prosperity to all parties, the British Parliament granted self-government to Ireland. But the six north-eastern counties desired to remain in union with Great Britain. Therefore, though they have a separate government with its capital at Belfast, and a Parliament of their own, they continue to send representatives to the English Parliament at London. The rest of Ireland has been formed into the Irish Free State, with its capital at Dublin, and has been given dominion home rule. The Free State is thus as independent as Canada or Australia, the King being represented in Dublin by a Governor-General. In most particulars of their home government the Free State is independent of Great Britain.

Perhaps some day the Free State and Northern Ireland may wish to unite, in which case it is quite possible for them to do so. When the difficulties of setting up the new government have been finally settled, we may look forward to a future of great prosperity, for industries may grow up round the ports of the eastern and southern coasts, and the food products from the agricultural lands should find an accessible and increasing market in the industrial areas of Britain. There are distinct signs of this, for in recent years matters have greatly improved.

EXERCISES.

1. What are the leading features of the relief of Ireland? How has the river system been affected by them? Why are bogs and lakes common features of Irish topography? How can bogs be reclaimed?
2. With what parts of Great Britain could you compare Antrim, South-western Ireland, the Wicklow Mountains, Donegal? Give reasons.
3. Compare the distribution of the population of Ireland with that of Scotland. Give reasons for the marked decline in the population of Ireland during the last sixty years.
4. Draw a sketch map of the west coast of Great Britain and of the north, east and south coasts of Ireland. Insert and name the chief ports and packet stations. Indicate the pairs of ports between which there are steamship communications. Which is the shortest route?
5. What are the chief Irish exports? Who is Ireland's chief customer? Why is this so? In which parts of the country are the Irish imports chiefly consumed?
6. Give geographical and historical reasons for the presence of two political units in Ireland.
7. Find out all about the Shannon Power Works at Ardnacrusha, and obtain photographs to illustrate your sketch map.

CHAPTER XX.

WALES.

PHYSICAL FEATURES.

WALES consists of a solid core of highlands extending from north to south and bordered on three sides by narrow coastal plains. In the north the coastal plain broadens into the low island of Anglesey, in the west the mountains come close to the coast, and the Plain of Cardigan is very narrow, whilst in the south the plain is wide in Pembroke in the west and in the Plain of Gwent east of Swansea, but narrower in the centre. Structurally, the greater part of Wales may be compared with the Southern Uplands of Scotland, for both areas are dissected plateaux composed of ancient, hard rocks, but the scenery is more reminiscent of that of the Scottish Highlands. The N.E.–S.W. trend of the more important features, which we found so prominently emphasized in Ireland and Scotland, is very evident in Wales. It is clearly seen in the direction of the mountain ranges (*e.g.* Snowdon Range and its continuation the Lleyn peninsula, the Berwyn Range and the south-western peninsula), in the river valleys (*e.g.* upper Dee, upper Severn, Towy and Teifi), and in the drowned river valley which now forms the Menai Strait. In the south, however, the direction of the "graining" is clearly east and west, as is demonstrated by the Pembroke and Gower peninsulas, the Brecon Beacons and the Plain of Gwent. This part of Wales may be thus compared with south-west Ireland. The Brecon Beacons are of Old Red Sandstone, a formation which extends eastwards through Monmouth and Hereford. South of the

Brecon Beacons, and including the Pembroke and Gower peninsulas, the rocks are the coal measures (see Fig. 40).

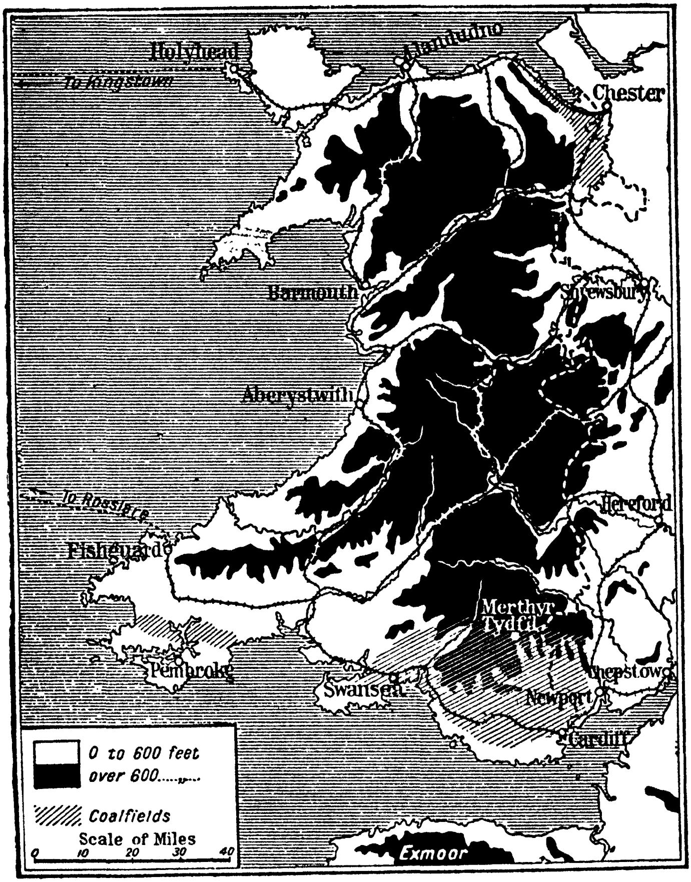


FIG. 40.—Wales. Relief, Routes and Coalfields.

The Welsh highlands have been deeply trenched by river valleys, which have broken them up into a number of separate masses. Thus, the Snowdon Range, with Snowdon (3,560 feet), the highest peak in England and Wales, lies between Menai Strait and the Conway, and the Berwyn Range between the Dee and the Severn. The watershed lies at no great distance from the west coast, so that the greater slope is towards England, *e.g.* the Dee, Severn and Severn tributaries. The valleys of those rivers which flow from the Welsh highlands to the English plains are of the greatest importance as routes.

When Angles, Jutes and Saxons poured into Britain, Wales became a sanctuary in which many of the earlier inhabitants of the invaded territory found refuge. The mountainous nature of the country and its difficulty of access helped this. But, as a glance at the physical map will make clear, there is no central point upon which the mountain valleys converge. Separated from each other by high mountain barriers, they open, either to the sea on the west, or to the English plain on the east, so that the unity of the whole under one strong central government was never possible. Moreover, the comparative ease with which conquerors could penetrate along the narrow plains bordering the north and south coasts, and along the valleys of the rivers flowing eastwards to the English plain, facilitated the English conquest of Wales. Nevertheless in such a land the physical features have helped many of its inhabitants to retain their ancient language, manners and customs, etc., and thus Wales may well be described as a "Treasure House of the Past," or a "Home of Lost Causes." To-day, by no means the least contribution of Wales to the life of Britain is the export of considerable numbers of its inhabitants, who find wider opportunities of advancement in its more richly endowed sister country.

CHIEF OCCUPATIONS.

The large proportion of the country which is mountainous, the poor soil and the severe climate of the mountainous regions, and the heavy rainfall, all limit agriculture to the coastal plains, Anglesey, and the river valleys. Very little wheat is grown, but oats, barley and root-crops are cultivated. Pastoral occupations are very important, particularly the rearing of cattle and sheep. Cattle-rearing and dairy-farming are chiefly confined to the plains, and particularly to the counties of Anglesey, Pembroke, Carmarthen and Flint, all of which lie within easy reach of markets for their products, whilst very large numbers of sheep are pastured in all the hilly parts of the country (see p. 148 and Fig. 31). The sheep are reared both for their flesh and for wool, the plentiful supply of the latter accounting for the manufacture of flannel and other woollen goods in many of the valley towns, particularly at *Newtown* in the upper valley of the Severn.

The mineral wealth is of considerable importance, especially the rich deposits of coal. The *South Wales Coalfield* has an area of 1,000 square miles, not including its westward extension in Pembroke. The main coalfield lies between the Usk on the east and the Towy on the west, and is divided into three parts by the Taff and the Tawe. Many varieties of coal are mined, including the bituminous coal of the east, the steam coal of the centre and the anthracite of the west. About two-thirds of the coal mined (p. 149) is exported to foreign countries from *Swansea, Cardiff, Newport,* etc. These towns are situated at the mouths of rivers which have cut their way across the parallel east and west ridges in which the coal is mined. Thus the rivers have not only facilitated the exportation of the coal, but, by exposing the coal measures, they have rendered mining operations easier. Great metal industries are carried on in this part of Wales, most of the ores being imported from abroad, particularly from Spain. Iron is smelted at *Cardiff, Swansea, Newport, Merthyr Tydvil* and other towns; copper, lead and zinc, in and around *Swansea*; tin-plate (made by coating iron plate with tin) is made at *Swansea* and *Llanelly*. Formerly, copper and tin ores were imported from Cornwall, hence the towns engaged in smelting them are located on the coast, but very little Cornish ore is now used. Those interior towns engaged in smelting imported iron ore (e.g. *Merthyr Tydvil* and *Dowlais*) originally only smelted local iron ore. *Cardiff,* the great port of the region, exports more coal than any other British port. The South Wales smokeless steam coal is in great demand for steamships, warships, etc. *Pembroke,* on the splendid natural harbour of Milford Haven, is a naval dockyard.

The *Flint and Denbigh Coalfield* in the north-east has only a small output and supports no very large industrial towns. *Wrexham* and *Ruabon* are the chief centres.

Building stones and slates are quarried in many parts of the country. The chief slate quarries are in Carnarvonshire, where the slates from the famous Bethesda and Llanberis quarries are exported from *Bangor* and *Carnarvon* on Menai Strait.

The magnificent scenery of the Welsh Mountains, and the grandeur of the coast, bring thousands of holiday-makers to the country, and the catering for their needs finds employment for large numbers of people. The watering-places of the north coast and of Anglesey (*Rhyl, Colwyn Bay, Llandudno, Bangor, Beaumaris,* etc.) are within easy reach of the vast populations of the Lancashire and Midland industrial regions, whilst those of the west coast (*Aberystwyth, Barmouth,* etc.) are most accessible to the Midlands. There are also many interior tourist centres, particularly in the Snowdon district.

The heavy rainfall of the Welsh Mountains has a special value for certain large centres of population outside Wales. The upper valleys of the Vyrnwy (North Montgomery) and a tributary of the Wye (West Radnor) have been barraged in order to create great reservoirs for the supply of water to Liverpool and Birmingham respectively. Manchester obtains most of its water from Thirlmere in the Cumbrian Lake District. This important economic value of many wet mountainous regions should be carefully noted. It is not improbable that even London may ultimately have to meet its needs by bringing water from Wales.

ROUTES AND CHIEF CITIES.

Wales is easy of access along the north and south coastal plains. These two routes have been of great importance for centuries, a fact which is emphasized by the number of castles found on both. The north coast route, used by Edward I for his conquest of Llewellyn, who made his stand in the Snowdon group, is commanded by Chester. It is followed by the London, Midland and Scottish passenger and mail route to Holyhead. Notice how very close to the sea the line is as it passes through Flint, Rhyl, Colwyn Bay, Conway and Bangor before crossing the Menai Strait by the Britannia Tubular Bridge. It then crosses Anglesey to the port of Holyhead, from which Kingstown, the port of Dublin, lies almost due west about 60 miles away. Llandudno, a beautifully situated holiday resort, is reached by a short branch line.

The south coast route was controlled by Cardiff Castle, but Gloucester was also a very important control point because it stood at the lowest bridging point of the Severn. In connection with the ease with which people and trade have passed along this great highway of South Wales, it is worthy of notice that the lowland county of Pembroke has been called "Little England beyond Wales," owing to its non-Welsh people and language. The Great Western Railway utilizes this route for its mail and passenger service to southern Ireland via Fishguard. Now that many of the homeward-bound American liners call at Fishguard, passengers and mails, by using this route, can arrive in London before the liners reach Liverpool. Railway lines reach Newport from Hereford, Gloucester and the Severn Tunnel and proceed via Cardiff, Swansea, Llanelly and Carmarthen to Fishguard. The sea passage to Rosslare, the port in S.E. Ireland, is about 55 miles.

Other routes which enter Wales from England utilize the valleys of the Dee, Severn and Wye. It was to overawe Wales and to control these routes that the three earldoms of the Welsh Marches—Chester, Shrewsbury, Hereford—were created, for, owing to the relative poverty of the highlands of Wales and the richness of the adjoining English lowlands, the Welsh often indulged in raids: hence "Taffy was a Welshman and Taffy was a thief." Chester commands the route which passes through Wrexham and Ruabon, and then follows the upper Dee and Lake Bala to the Mawddach, past Dolgelly to Barmouth. This route is connected with the north coast route by railways following the Conway and the Clwyd valleys.

Shrewsbury commands the line following the upper Severn, and passing through Welshpool and Montgomery. The line leaves the main valley and follows that of a tributary, which leads it over a low watershed (below 700 feet) to the valley of the Dovey, where the line forks, one branch proceeding via Aberdovey and the coast to Barmouth, Portmadoc and Pwllheli, the other to Aberystwyth. This town has railway connections with the south coast route at Carmarthen by means of a single line, which crosses two low watersheds and makes use of the upper valley of the Teifi. Carmarthen and Swansea are also connected with Shrewsbury, by a line which follows the north-east to south-west trend of the mountain chains, and thus uses tributary valleys of the Wye and the main valley of the Towy. Cardiff can be reached from Shrewsbury by a line following the plains along the eastern margins of the high ground and passing through Hereford and Newport. The position of Shrewsbury in relation to the main routes of Wales is very interesting, for although it is an English city it is in many ways most suited for being the capital city of Wales, owing to the ease with which it can communicate by rail with North, Central or South Wales. It is because of this that the colleges of the University of Wales (Cardiff, Aberystwyth and Bangor) hold their meetings there.

For the reasons explained on p. 202, Wales never had a capital of its own.

EXERCISES.

1. Compare the Scottish Border with the Welsh Border as regards their relative strength for defence or attack in the days when Scotland and Wales were independent of England.

2. Draw the following maps of Wales: (i) Relief, routes and coalfields; (ii) relief, coalfields and distribution of population; (iii) relief and the distribution of cattle and sheep. For relief shade land exceeding 600 feet. In order to indicate the distributions of people, cattle and sheep, mark the county boundaries and obtain the statistics from a book of reference. Add written descriptions to each map. Why would the map be more satisfactory if the parishes instead of the counties were used as the units?

3. Name four important Welsh holiday resorts. From what districts will each draw the bulk of its visitors? Why?

4. On what grounds can it be said that Shrewsbury, an English city, is the best centre for a Welsh capital? Mention any Welsh town which appears to you to offer equal facilities.

5. If you lived in Birmingham or London and wished to spend a summer holiday in Pwllheli which route would you prefer, the L.M.S.R. via Chester and the north coast of Wales or the G.W.R. via Welshpool, Aberdovey and Barmouth? If you select the latter, study your map and find an alternative route for the return journey on the line of the same railway.

6. The number of London drapery and dairy establishments owned by Welshmen is striking. Can you suggest any geographical factors which help to explain this?

CHAPTER XXI.

THE WELSH BORDER AND THE SEVERN BASIN.

WALES is very intimately associated with the adjoining English lowlands and hill lands. Indeed, North Wales has more associations with the Cheshire Plain, and South Wales with the lower basin of the Severn, than these two parts of Wales have with each other. Wales has a longer slope to the east than to the west, and the roughly east and west trend of the valleys of the upper Dee, Severn, Teme, Wye and Usk, as well as the great east and west routes along the coastal plain of the north and the south, have all helped to render the penetration of English influences a matter of comparative ease, and thus to make the perpetuation of an independent Wales practically impossible. The Welsh borderland falls naturally into two units: (i) the Cheshire Plain, adjoining North Wales, and (ii) the plains and hill country of the Severn basin which lie along the margins of Central and South Wales.

THE CHESHIRE PLAIN.

This plain is drained by the lower Dee and the Weaver, a tributary of the Mersey, and is divided into two portions by a low ridge (over 300 feet in height) which forms the watershed between the two rivers. The plain is composed of New Red Sandstone, largely covered by a fertile drift, and alluvium; and as it lies to the leeside of the highlands of North Wales it has a moderate rainfall, but sufficient for both *pastoral* and *agricultural* industries. The agriculture generally takes the form of market gardening, due to the proximity of the large population of south-east Lancashire, but the dairy produce, particularly cheese, is equally important.

Salt is obtained at Middlewich and Northwich. In some places the rock salt is quarried, but the usual method is to pump water into the mines and then to draw off the brine and obtain the salt by evaporation.

This process leads to frequent collapsings and subsidences, so that the Cheshire salt towns are noted for the unevenness and irregularity of the outlines of the houses. The salt deposits have led to the growth of chemical and glass industries both in Cheshire and adjoining Lancashire towns. The Lancashire coalfield extends into N.E. Cheshire, where *Stalybridge, Hyde* and *Stockport* are cotton manufacturing towns. *Macclesfield,* further south, manufactures silk goods. *Birkenhead,* opposite Liverpool, has extensive shipbuilding yards.

The Cheshire Plain is of great importance owing to the routes which cross it. On the one hand, it gives the easiest approach from the lowlands of Eastern and Central England to the lowlands of Lancashire and to the west coast routes to Scotland, and, on the other, to the plain of North Wales, and beyond to Ireland. The London, Midland and Scottish route for the north passes along the Weaver valley through *Crewe,* and crosses the Mersey at Warrington. The mail and passenger route for Holyhead and Ireland branches off at Crewe and proceeds north-westwards to Chester. Thus Crewe has become a very important railway junction. Its rapid growth has also been affected by the location in the town of the L. M. S. engineering works. *Chester,* a prosperous town in Roman days, 2,000 years ago, is the key to the route to the narrow north coast plain of Wales and to Ireland, and also to the route along the upper valley of the Dee. Formerly it was an important port for Ireland, but the Dee estuary has been so silted up that it is now inland and can only be reached by small boats. The town has many notable sights, among which its ancient city walls, castle, cathedral and old houses are the most famous, and indicate clearly the past importance of the city.

The continuous stretch of plains from the Midlands to the Irish Sea makes the construction of canals linking the Mersey with the Trent and the Midlands a matter of comparative ease. The Birmingham Canal connects Birmingham and the Black Country towns with the estuary of the Mersey, and the Trent and Mersey Canal gives the same connection with the Potteries (see Fig. 44). Although these canals are only broad and deep enough for large barges they are of great value in the transportation of heavy and bulky articles, *e.g.* coal, iron ore, building stone and kaolin.

THE SEVERN BASIN.

The Severn rises in the Plynlimmon group, about twenty miles from Cardigan Bay, and after flowing north-eastwards enters the English lowlands above Shrewsbury. It then takes a great semi-circular course along the New Red Sandstone plains bordering the hill country, and finally reaches the sea in the great estuary of the Bristol Channel (see Fig. 41). Its chief right bank tributaries are the Teme, Wye and Usk, whilst from the left bank it receives the Warwick and Bristol Avons. Notice the north-east to south-west trend of the lower Severn and the Warwick Avon valleys (and also the lower Trent). These have been cut out in the soft measures along the base of the oolitic scarp (see Fig. 45). Formerly this plain stood much higher than it does to-day, and it is believed that the Severn above Tewkesbury was then the main headstream of the Thames, and that the lowering of valleys of the rivers flowing parallel to the Cotswolds brought about the separation of the upper Severn from the Thames and its capture and deflection to the Bristol Channel by the Warwick Avon and the lower Severn.

The basin of the Severn contains several sharply contrasted areas. The main stream and its longer western tributaries rise in the old, hard, slaty highlands of Wales. The region comprising the counties of Brecon, Hereford, Monmouth and parts of Shropshire and Worcester, and drained by the lower Teme, Wye and Usk, belong to the Old Red Sandstone measures, and are noted for their rich pastures and the great fertility of the soil. The middle and lower plain of the Severn and the valley of the Warwick Avon are plains of New Red

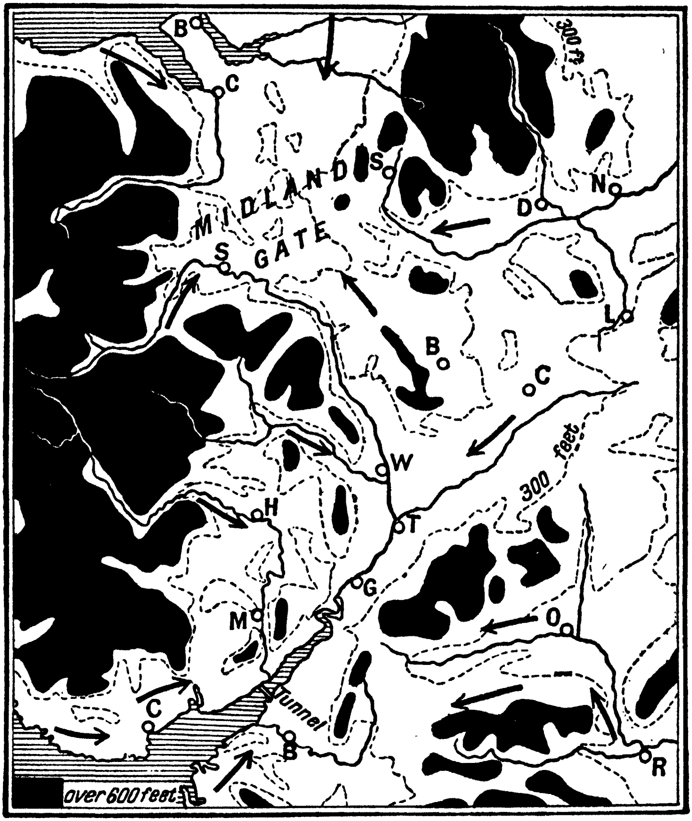


FIG. 41.—Sketch map of the Welsh Borderlands and the Severn Basin.

Sandstone covered in places by deposits of alluvium and bordered in the south-east by scarplands of oolitic limestone, whilst the Bristol Avon extends its basin beyond the latter ridges and drains a small clay vale east of the Cotswolds.

The upper basin of the Severn lies between the source and the gorge where the river passes between the Wrekin, an isolated volcanic mountain nearly 1,350 feet in elevation, and Wenlock Edge, an outlier of the South Shropshire Hills. It may be subdivided into the Vale of Powis, its mountain valley, and the Plain of Shrewsbury. It is very probable that the upper Severn emerged from the Welsh highlands to a plain which formerly stood at the level of the tops of the Wrekin and Wenlock Edge, and that the gorge already mentioned has been produced by the lowering of the plain to its present level.

The highlands of the upper valley are chiefly used for the pasturing of sheep, which has led to the establishment of small woollen industries. In the Plain of Shrewsbury, which is separated from the Cheshire Plain by a low watershed, agriculture and cattle-rearing are the chief industries. Between the Cheshire Plain and the English Midlands the plain is narrowest where the Severn makes its great bend, *i.e.* where the South Shropshire Hills, outliers of the Welsh Mountains, come closest to the Pennines. This comparatively narrow gap is known as the *Midland Gate* (see Fig. 41). *Shrewsbury*, the most important town on the upper Severn, had its origin in an old British stronghold built on a sandstone rock around which the Severn makes a loop. It stood at the junction of Watling Street, the Roman road from London to Chester, and another Roman road traversing the hill country to Hereford in the south. Later roads converged upon the city from the upper basin of the Thames, from Birmingham and from Crewe, whilst in modern times all these routes are followed by important railways.

The Severn valley does not open out into the broad plains of its middle course until it leaves Bewdley, north of the confluence of the Stour. In the narrow valley between the Plain of Shrewsbury and the middle basin (note how close the 300 feet contour approaches to both banks of the river) there are several small mining and industrial centres. *Coalbrookdale* has a small coalfield, now almost exhausted, and its ironworks made the first iron bridge in the country. This bridge still crosses the Severn at *Ironbridge. Bridgnorth,* a very beautiful town partly built at the river level and partly upon a high sandstone cliff overlooking the river, has a small carpet industry. On the top of the cliff are the ruins of an old castle, which formerly dominated this gorge-like portion of the river.

The rich agricultural and pastoral plain of the middle and lower Severn is broadest where the valley of the Warwick Avon opens out to it on the east. Further south it narrows between the Cotswolds and the Forest of Dean. The Stour valley leads to the Black Country and contains *Kidderminster,* noted for carpets. The Warwick Avon drains a rich agricultural and pastoral region noted for its orchards, especially in the neighbourhood of *Evesham,* located on the river where it enters the plain of the main stream. In the upper valley, however, *Coventry* is famous for its motor cars and cycles, whilst *Rugby* has electrical engineering works. Other towns are: *Leamington,* a residential town with mineral springs, *Warwick,* a fine old city with an imposing castle, *Stratford-on-Avon,* famed as the birthplace of Shakespeare, and *Tewkesbury,* where the river enters the Severn. All these towns have considerable local importance as market centres.

Worcester, centrally placed in the Plain of Worcester, stands near the confluence of the Severn and the Teme, and commands the routes following the Teme, as well as those from the valley of the Warwick Avon. It has potteries and is particularly noted for finest porcelain. *Gloucester* grew up at the lowest bridging point of the Severn, and on account of this, and its excellent position for controlling the routes along the coastal plain of South Wales, it very early became an important city.

The approach to the city by river is very difficult owing to the bore formed by the tide (see p. 132). Therefore, in order to make it accessible for ships bringing timber, grain, etc. for the thickly peopled Black Country coalfield, a canal has been constructed between Sharpness and Gloucester. From Gloucester the goods are dispatched to their destination either by rail or by boats, the latter using the canalized Severn and the canals which connect it with Birmingham and other midland cities (see Fig. 44). *Droitwich, Malvern* and *Cheltenham* are residential centres and inland watering places. Salt obtained at the first-named town is used for the glazing of Worcester pottery.

Of the right bank tributaries the Wye is the most important. It rises near to the source of the Severn, and after leaving the Welsh highlands, winds across the fertile plain of Hereford, which is composed of Old Red Sandstone rocks formed in a basin lying between the Malvern Hills to the east and the Welsh highlands to the west (see Fig. 46). *The Plain of Hereford,* like other Old Red Sandstone plains (*cf.* Strathmore), is very fertile, and is noted for cattle-rearing, dairy-farming, fruit and hops. The Malvern Hills rise very abruptly from the plain on their eastern margins, and this is due to the presence of a great fracture which skirts the eastern base of the hills. The formation of this fault let down the New Red Sandstone measures underlying the adjoining Severn Plain. *Hereford,* the chief town, stands on the Wye, and, like *Ludlow* on the Teme, is a typical border town with many historical associations. Both are on the main north and south roads and railways which follow the direction of the border from Shrewsbury to Newport, and also command the east and west routes following the rivers upon which they stand.

On leaving the Plain of Hereford the Wye flows through a gorge which it has cut in the carboniferous limestone plateau known as the Forest of Dean. *Monmouth* lies to the north of this gorge and *Chepstow* to the south. The Forest of Dean has a small coalfield.

Iron has been smelted there from Roman times—formerly, of course, by the use of wood for fuel.

The Cotswolds are noted for their sheep-rearing, and this, together with an abundant wool supply, led to the early development of woollen cloth manufactures at *Stroud, Frome* and *Bradford-on-Avon.* One tributary of the Severn has cut its way right through the Cotswolds and now rises on the eastern side. Its valley was utilized for the construction of the Thames and Severn Canal, which reaches the latter river below Gloucester.

The Bristol Avon is in many respects a most remarkable river. Its headstream flows eastwards along the gradual eastern slope of the Cotswolds. It then turns southwards following the direction of the Cotswolds, but flowing along the clay vale between those hills and the White Horse Hills. Later it turns westwards and enters the gorge which it has cut to the south of the Cotswolds. After passing Bristol it flows through another gorge cut in the small carboniferous limestone plateau (*cf.* the Wye gorge in the Forest of Dean) between Bristol and the sea. It would seem as though the river first cut its way backwards through the gorge south of the Cotswolds, that it then developed a lateral tributary along the soft clay, and that this captured and deflected to itself a former tributary of the Thames (*i.e.* the part of the river above Malmesbury). *Bath,* which controls the approach to Bristol from the Thames basin, is one of the oldest towns in Britain. It is a residential city, and still retains the warm springs which made it famous in Roman times.

Bristol owed its origin as a port to its trade with Ireland, but this was extended by the great discoveries of the fifteenth and sixteenth centuries to the West Indies and to North and South America. With these countries it still has a considerable trade, upon which its tobacco, cocoa and sugar manufacturing industries are based. In modern times, however, the increasing size of vessels has meant that Bristol has been handicapped in the competition with other western ports, particularly with Liverpool, not only for the American trade, but also for the trade of the industrial districts of the English Midlands. The port's disadvantages in this respect are due to the presence of the Clifton gorge between Bristol and the sea, and to the great tidal rise and fall of the river Avon. It is, however, conveniently situated with regard to the supply of coal from the Bristol and Somerset coalfield. The disadvantages of the port are somewhat counterbalanced by the docks which have been constructed at *Avonmouth,* the modern harbour for large ocean-going vessels. The Avon is connected to the Thames by two canals, the Kennet and Avon and the Wilts and Berks. These pass south and north of the Marlborough Hills respectively.

EXERCISES.

1. Compare the present and past importance of the ports of Bristol and Liverpool. What geographical factors have effected them?
2. What evidence is there for believing that the upper and middle Severn were formerly the upper Thames? Account for the direction taken by the Bristol Avon in different parts of its course. Make a map to illustrate the account given on p. 215. Where are there gorges in the Basin of the Severn? Where broad plains? Give reasons.
3. Draw a large map of the Severn Basin, marking and naming the chief tributaries; the Plain of Hereford; the Midland Gate; the Vale of Evesham; the chief towns; the water connections with other river systems; the coalfields. The map should be shaded for high ground and the chief hills and mountain ranges named clearly.
4. Draw sketch maps to show the geographical factors which have helped the growth and development of the following cities—Gloucester, Worcester, Shrewsbury.

CHAPTER XXII.

THE MIDLANDS AND THE BASIN OF THE TRENT.

PHYSICAL FEATURES.

EAST, south and west of the Pennines the older measures of that mountain system dip under the newer formations and make a foundation upon which the latter rocks rest. The great Red Plain of the Midlands, and its northern extensions on both flanks of the Pennines, are chiefly built of new red sandstone and of red marl, a kind of clay. But as in East Anglia, there are many places covered with boulder clay and other glacial deposits, whilst along the courses of the main rivers alluvial deposits are frequently extensive. These newer rocks do not, however, form a continuous level surface, for in places the older rocks of the floor stand out above the general level (see Fig. 25), as in North Leicestershire, North Warwickshire and South Staffordshire; and since these older rocks are the coal measures we have thus three coal-mining areas. It is probable that coal extends beneath all the younger measures and may be mined where the depth is not too great.

The Trent, the chief river of the Midlands, rises on the south-west flanks of the Pennines, and after bending round their southern margins turns northwards to join the Yorkshire Ouse in their combined estuary called the Humber (see Fig. 42). On the left bank the Trent receives swift-flowing Pennine feeders, such as the Dove and the Derwent; whilst on its right bank it is joined by the sluggish rivers flowing from the low, oolitic limestone hills which continue the line of the Cotswolds in a north-easterly direction. Most of the water carried to the Humber by the Trent is brought by the Pennine streams. Indeed, it is common for the plains adjoining the lower course of the main stream to be in serious danger of inundation at a time when little rain is falling locally, but when heavy rains are being experienced in the region of the Pennine sources. Notice the river Witham, whose upper course is parallel to that of the

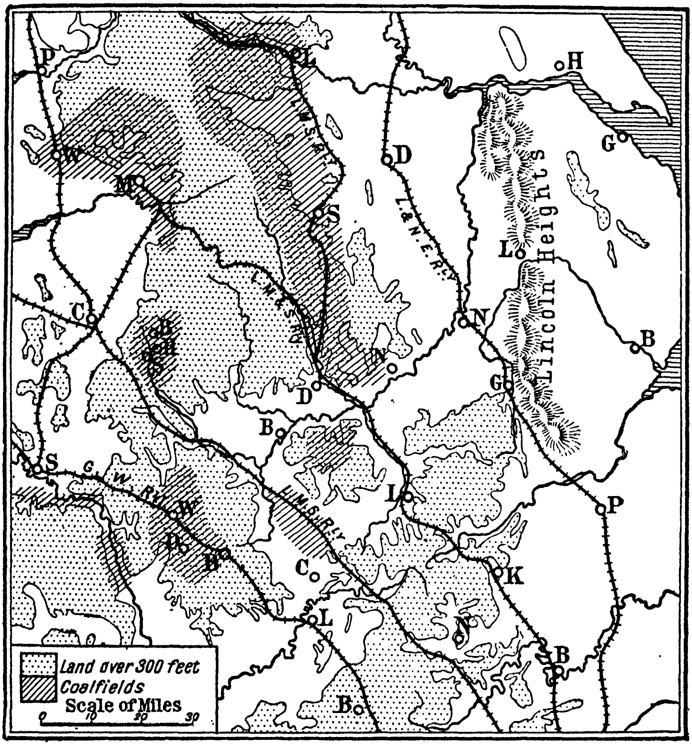


FIG. 42.—The Midlands and the Basin of the Trent.

Trent. At Lincoln the Witham flows through a gap cut in the oolitic ridge, and then flows south-eastwards to the Wash. It is believed that this was once the course of the Trent.

OCCUPATIONS OF THE TRENT BASIN.

On the coalfields the development of great industries has led to the growth of large centres of population. Elsewhere, pastoral and agricultural occupations are followed, for the soils of the Red Plain are very fertile.

The *North Staffordshire Coalfield,* situated on the south-western flanks of the Pennines, is noted for mining and the manufacture of pottery ware, hence it is commonly called *The Potteries.* The pottery trade owed its origin to the presence of local deposits of clay suitable for manufacture, but only the coarser kinds of articles are now made of local clay. For the finest china and porcelain Cornish and Devonshire potter's clay or kaolin is imported by sea to the Mersey and thence to the pottery works by canal. The industry is carried on in the neighbourhood of the "Five Towns," of which *Stoke, Burslem* and *Hanley* are the chief. *Stafford* lies south of the Potteries, in the basin of a tributary of the Trent. The surrounding country has rich pastures, which support large numbers of cattle, and these gave to Stafford its leading industry—the manufacture of boots and shoes.

The South Staffordshire Coalfield.—This coalfield is situated on the watershed between the Trent and the Severn, and extends from a little south of Stafford in the north to a little north of Birmingham in the south. It has the advantage of possessing considerable quantities of iron ore. Unfortunately, however, the latter is neither found in sufficient quantities nor is of sufficient quality to meet the demand, and much foreign ore has to be imported, particularly ores of high grade. The distance of the coalfield from the sea makes this a serious drawback, for despite the construction of canals (see Fig. 44) to the Mersey, the Humber, the Thames and the Severn, the competition of iron manufacturing regions situated on or near the coast (*e.g.* South Wales and Tyneside) is very severely felt. In former days the iron ore was smelted with charcoal from the Forest of Arden and Cannock Chase—during the Civil Wars of the seventeenth century the district supplied the Parliamentary army with swords, etc.—and when, in later times, coal took the place of wood fuel, the industry naturally remained where it had sprung up.

Before the coal-mining days, South Staffordshire was a picturesque, well-wooded, hilly country. To-day its forests have largely disappeared, and its surface is disfigured by pit-shafts, huge banks of refuse from pits and blast furnaces, inky canals, thousands of factories and by all that goes to make up a modern coal and iron mining and manufacturing region. It is on this account that this coalfield is known as the *Black Country.* All the towns are engaged in iron and hardware manufactures and produce a great variety of goods.

The great centre of the Black Country is *Birmingham,* which is engaged in the manufacture of a variety of articles, but is particularly noted for fire-arms and ammunition, engines, motor-cars and cycles, scientific instruments, etc. Although the city is not on the coalfield itself, its excellent canal and railway connections have made it the great trade centre of the whole district. It is one of the very few large cities situated on a watershed. *Wolverhampton, Walsall* and *Dudley* are three of the chief towns actually located on the coalfield.

The Warwickshire Coalfield lies east of the Tame and extends to a few miles north of Coventry, which is in the basin of the Avon. *Coventry* has had a varied industrial history, and was formerly noted for its manufacture of silk. At the present time it is a very important centre for the manufacture of cycles and motor-cars, whilst during the Great War it was one of the chief centres for the manufacture of munitions. *Nuneaton* and *Tamworth* are also on this coalfield.

The Leicestershire Coalfield lies in the north of that county and extends into South Derbyshire. *Ashby-de-la-Zouch* is an important mining town, and *Burton-on-Trent,* owing to the suitability of its waters, a great brewing centre. *Leicester* lies some distance south-east of the coalfield, so that coal has to be brought to it by rail. It is engaged in the manufacture of woollen hosiery and boots and shoes, industries which suggest the keeping of both sheep and cattle. The former are reared on the hill country of the oolitic limestone scarplands which lie in the south of the county, the latter on the rich pasture lands of the Trent and Soar lowlands. Wool and hides are, however, not produced in sufficient quantities to supply the demand, and both have to be imported. The Stilton cheeses and pork-pies of Melton Mowbray further em-

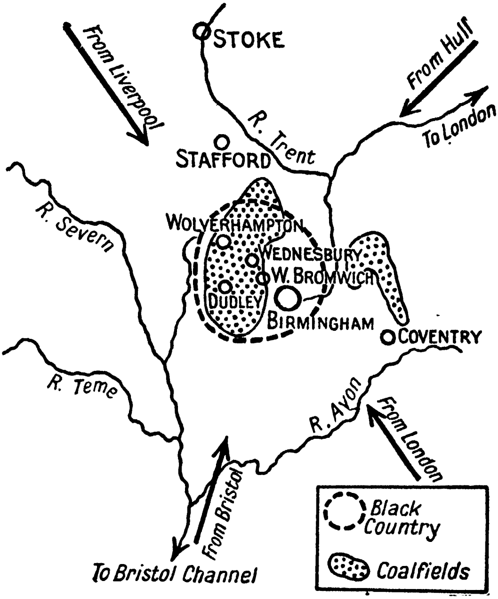


FIG. 43.—The Black Country.

phasize the importance of dairy-farming. Find on a physical map the high tract of land called *Charnwood Forest,* lying between Leicester and the coalfield. The rocks of this hilly district are slates and granites like those of Wales. On this account it has been described as a bit of Wales within the English lowlands, and also as a solitary place within a thickly peopled region, a wilderness in the midst of mines and manufactures.

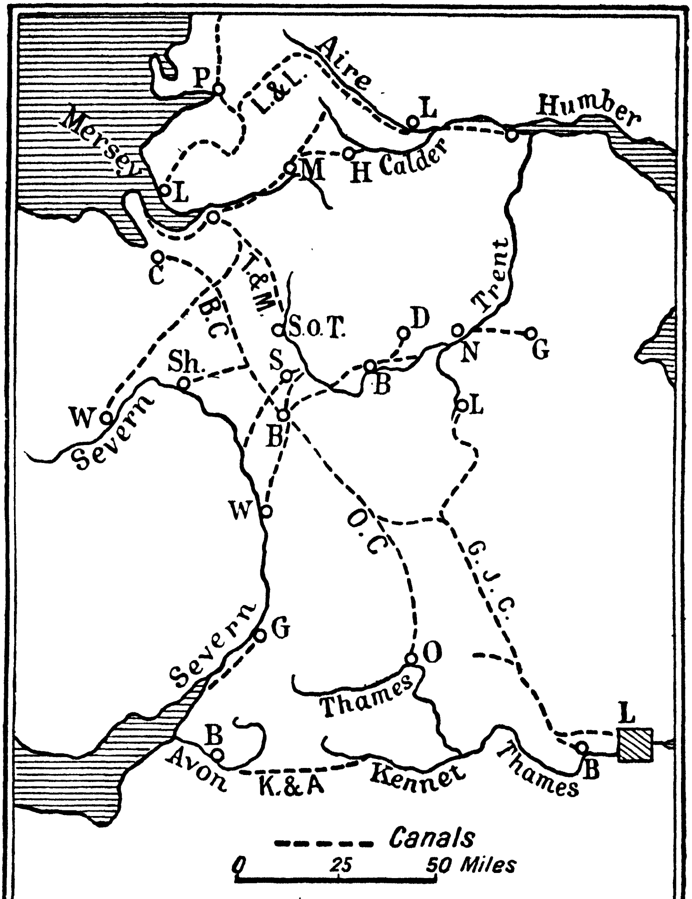
The Derby and Nottingham Coalfield lies on the flanks of the south-eastern Pennines and is the southern part of the great coalfield which extends almost from the Wharfe to the Trent. *Derby* is an engineering centre of the L. M. S. Railway, and has also silk and china industries. *Nottingham,* on the Trent, manufactures cotton hosiery and lace (see p. 161).

During the last twenty or thirty years the mining area has been extended further eastwards and a new and very important coal-producing region has been developed (see also p. 160).

The lower course of the Trent lies across plains over which the river has spread deposits of alluvium. The dry climate makes it possible for wheat to be grown extensively, whilst enormous quantities of potatoes and root-crops are also produced. The chief centres are *Newark* and *Gainsborough.* The latter is situated near the tidal limit of the Trent and experiences the famous *eagre* (see p. 132). Between Gainsborough and the Humber the land adjoining the river is very low and marshy (*e.g.* Isle of Axholme), and resembles the Fens and the marshes of the Lincolnshire coast. All these have been caused by the depression of the whole surface of the East Midlands and East Anglia, and the subsequent invasion of the sea over the lowlands.

ROUTES OF THE TRENT BASIN.

The main railway routes from London enter the Trent Basin and then proceed northwards either to the west or to the east of the Pennine uplift, although several routes utilize Pennine valleys and cross from one side to



CHIEF ENGLISH CANALS NOW IN USE

FIG. 44.

the other. From Rugby the L. M. S. Railway runs via Nuneaton, Stafford and the Midland Gate to the plains of Lancashire and the north, while the L. and N.-E. Railway routes from Grantham and Lincoln cross the Trent at Newark and Gainsborough, and converge upon Doncaster before proceeding via the Vale of York to the north. From Rugby (L. and N.-E. Railway) and Leicester (L. M. S. Railway) routes pass through Nottingham and Sheffield, the former then crossing the Pennines via the Woodhead Tunnel to Manchester, the latter proceeding to Leeds and the Aire Gap before crossing the west side of the Pennines. Other L. M. S. lines give communications between Leicester, Derby and Manchester (using the valley of the Derwent in negotiating the Southern Pennines), and between Birmingham, Burton, Derby and Sheffield (see Figs. 34 and 42).

The chief canal communications are shown on Fig. 44, which brings out what has been done to render of less effect Birmingham's great disadvantage of being so far from the sea. It will be seen that it is connected by canals with the four great estuaries of England. In the near future it is very probable that much will be done to make these inland waterways of greater economic value than they are at present. Since they were constructed, comparatively little has been done to make such improvements as are necessary for the needs of modern conditions. In this respect Britain is much behind many continental countries.

EXERCISES.

1. How far is it true to say that the Trent Basin includes samples of all the different types of regions in the British Isles?

2. Why have the coalfields of North and South Staffordshire been called respectively the Potteries and the Black Country? Account for the industries which are carried on in each region.

3. How far is Birmingham from Liverpool, Hull, London and Bristol? State the advantages and disadvantages of each of these ports with regard to their trade with Birmingham.

4. Draw a sketch map of the basin of the Trent. Shade the areas which have high ground and insert the main river and its chief tributaries. Mark the coalfields, indicate the different agricultural and pastoral activities of the basin, and mark and name the chief towns.

5. Find out particulars of the coal pits which have extended the Nottingham mining area further towards the east. What has been done to prevent the growth of ugly townships? How far have the steps succeeded?

CHAPTER XXIII.

THE SCARPLANDS AND PLAINS OF SOUTH-EASTERN ENGLAND.

I.—The Basin of the Wash and East Anglia.

South and east of the line formed by the lower Severn, the Warwick Avon and the lower Trent, the New Red Sandstone measures of the Midland Plain dip beneath layers which form the long, curved but broken line of hills extending from Portland Island to the Yorkshire Moors. These hills are composed of jurassic limestone, which is also called roestone or oolitic limestone, because it is composed of very small round or egg-shaped grains. Fig. 45 shows that this belt of limestone includes the Cotswolds, Edge Hills, Northampton Uplands and the Lincoln Edge, and that it is gradually diminishing in breadth, whilst between the Lincoln Edge and the Yorkshire Moors it disappears altogether. The oolitic measures dip eastward (see Fig. 46), first below vales of clay and other soft layers, and then below a great sheet of chalk, which in turn forms a broad basin, the London Basin, largely filled with clays and sands. It will be noticed that both the limestone and the chalk measures end in an abrupt steep face, or escarpment, and that the other slope, or dip slope, is much less steep. It is believed that these measures once extended much further west, and that they have been eaten back by weathering and by the action of streams. These forces have also been at work in lowering the level of the vales of softer layers which separate all the belts of more resistant rock.

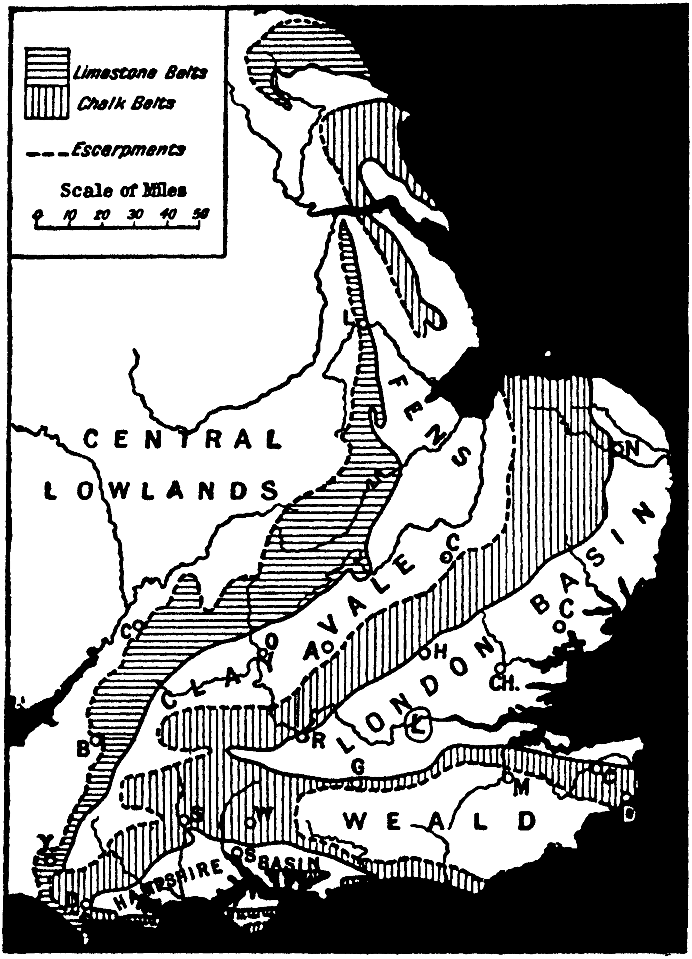


FIG. 45.—The Scarplands of South-Eastern England.

In south-eastern England the North and South Downs were formerly united by a great arch of chalk which has been removed so that the older measures of the Weald are now exposed. In the central part of Southern England, south of Salisbury Plain, the chalk layers dip beneath younger, softer measures, chiefly clays and sands, comparable to those of the London Basin, and form what is known as the Hampshire Basin. The chalk reappears in the centre and south of the Isle of Wight. The chalk hills radiate from the upland of Salisbury Plain, and should be followed on Fig. 45 and also on a physical map of England. One long crescent-shaped line, roughly following the direction of the oolitic ridges, with its escarpment looking towards the Midlands, includes the White Horse Hills, frequently called the Marlborough Downs, Chilterns, East Anglian Heights, Norfolk Edge, Lincoln Wolds and the Yorkshire Wolds. This line has been breached in several places, but notably by the Wash and the Humber. East of Salisbury Plain the chalk is continued as the Hampshire Downs. These split into two lines of hills, the North and South Downs, which run roughly eastwards and terminate on their seaward ends in the cliffs of Dover and Beachy Head respectively. They are, however, continued across the narrow seas into France, their

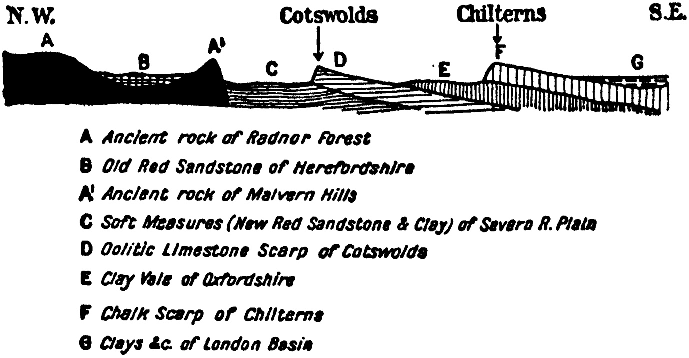

N.W.
Cotswolds
Chilterns
S.E.
A
A'
B
C
D
E
F
G
A Ancient rock of Radnor Forest
B Old Red Sandstone of Herefordshire
A' Ancient rock of Malvern Hills
C Soft Measures (New Red Sandstone & Clay) of Severn R. Plain
D Oolitic Limestone Scarp of Cotswolds
E Clay Vale of Oxfordshire
F Chalk Scarp of Chilterns
G Clays &c. of London Basin

FIG. 46.—Diagrammatic Section from Radnor to London.

present separation being due to the formation of the Straits of Dover. A fourth line, the Western Downs, or Dorset Heights, extends from Salisbury Plain in a south-western direction.

South-eastern England may be divided into the following units:—

(i) *The Basin of the Wash,* which includes the Fens.

(ii) *The Thames Basin and East Anglia.*—This includes two distinct areas: (*a*) the Upper Basin, which is a south-western continuation of the Basin of the rivers draining to the Wash; (*b*) the London Basin, which includes the great triangle of lowland between the North Downs on the one hand, and the Chilterns—East Anglian Heights—Norfolk Edge line of hills on the other.

(iii) *The Weald,* the great horse-shoe shaped region enclosed by the North, Hampshire and South Downs.

(iv) *The Hampshire Basin,* including the Isle of Wight.

Economically these scarplands and lowlands of south-eastern England are in striking contrast to the rest of the British Isles. They include much less than half of the area of England and Wales, but over three-fifths of the arable land, and, of course, only the gentler slopes of the hills will be ploughed. Agriculture is everywhere the leading occupation of the plains and sheep-rearing of the hills. But it must not be forgotten that it is this essentially agricultural part of England which has had most to do with the making of the country's history, for the large masses of people now concentrated upon the coalfields of northern England are features of comparatively recent growth. And, as in the great plain of northern France, so in the lowlands of south-eastern England, until the days of coal and iron there was only one really large town, Paris in France, and London in England, which dominated the whole region and grew rich and powerful thereby.

But even here in agricultural south-eastern England great changes are taking place, and it looks as though the region will in the future become noted for its great industries. Coal can be transported with ease and can be used for making steam power to work great turbines, which in their turn work dynamos which generate electricity. Electricity can be distributed over wide areas and used in manufacturing industries of many kinds. London itself is one of the chief industrial centres in Britain; Oxford and Slough have extensive motor-car industries, and new works of all kinds are springing up along railways and along the new arterial roads. Let us hope that the coming of manufacturing industries to rural England will not be allowed to spoil the countryside as has happened in the older industrial areas in the coalfields.

THE BASIN OF THE WASH.

The Wash is a wide opening formed by encroachments of the North Sea brought about by the subsidence of the land and the breaching of the chalk scarplands at a point where they were very low. It occupies the lowest part of *The Fens,* tracts of low-lying, marshy and formerly sea-covered lands. In past times the Fenland extended as far inland as Cambridge, Huntingdon, Peterborough and Lincoln; but much of it has been drained by the construction of drainage canals, such as the famous Bedford Levels, by the canalization of the rivers, and by the introduction of windmills and other agencies for pumping water from the lands to the watercourses. The Wash itself is diminishing in size, partly owing to the deposition of the silt brought down by the rivers, and partly to the dumping of sand and other materials produced by coastal erosion and swept along by the tides. The English Fens bear a close resemblance to the low-lying lands of Holland (= hollow or low land) on the opposite side of the North Sea. Indeed, the southern part of Lincolnshire is actually called Holland.

The chief rivers flowing to the Wash are the Witham, Welland, Nen and the Great Ouse. All these rise in the oolitic escarpment, but the Witham rises on the western slope and does not reach the clay vale between the limestone and the chalk ridges until it has passed through the Lincoln gap. Notice also the parallel courses of the Welland, Nen and Ouse, and how very low are the divides or watersheds between them. They are good examples of longitudinal rivers.

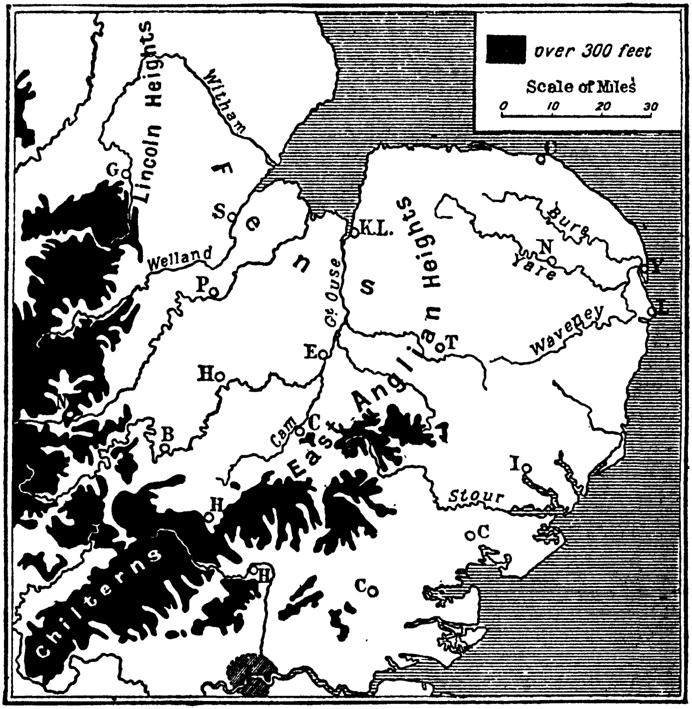


FIG. 47.—The Basin of the Wash and East Anglia.

Occupations of the Basin of the Wash.

In this part of England the broad expanse of plains and the semi-continental character of the climate make agriculture the leading occupation. Great quantities of cereals (particularly wheat), pulses, root crops (especially beet, grown for sugar, and potatoes) and fruit are produced. Pastoral occupations, too, are of considerable importance, and both cattle and sheep are reared, but not in really large numbers, except on the marginal limestone and chalk scarplands whose dry pastures support large numbers of sheep. The absence of coal militates against the growth of manufacturing, except of such articles as are required in the pursuit of agriculture, or of goods for whose manufacture the pastoral pursuits provide the raw material. Thus, agricultural implements are manufactured at Peterborough, Bedford and Lincoln, whilst boots and shoes are made at Northampton and Kettering.

In the limestone and other measures close to them more iron ore is obtained between Northampton and the Humber than in any other district in Britain. There are important blast furnaces at Wellingborough, Kettering and Scunthorpe, and a new area is now being developed at Corby, near Kettering (see Exercise 6 on page 235).

On or near the coast there are small ports with fishing industries. *King's Lynn* and *Boston* are the chief of these. Both are considerably hampered by the difficulties of navigation amid the shoals of the Wash, and can only be reached by small vessels. *Grimsby,* on the Lincolnshire coast, near the mouth of the Humber, is not in the basin of the Wash, but this is the most convenient place to refer to it. It is an important port—the seventh in the United Kingdom in order of the value of its imports and exports—and carries on a large trade with the Baltic and North Sea ports, especially in the cotton and woollen manufactured goods of Lancashire and Yorkshire. It is also a great trawl-fishing centre.

Immingham, a few miles further up the Humber, is a new deep-sea port, whose growing trade resembles that of Grimsby and Hull.

CITIES AND ROUTES OF THE BASIN OF THE WASH.

Three leading types of town sites can be distinguished. Cambridge, Bury St. Edmunds, Bedford, Huntingdon and Peterborough are the chief of a number of towns standing on the raised, and therefore drier, ground surrounding the Fen depression. Within the Fens themselves are many towns which grew up on raised gravel "islands." Of these the chief are the cathedral city of Ely (the refuge of Hereward the Wake), March and Spalding. The third set of towns are along the coast.

Before the Fens were drained they formed a serious obstacle to communications. In Roman times the great road from London to Lincoln skirted their western margin and passed through Cambridge, Huntingdon and Peterborough. *Cambridge,* a famous University town, stands on the Cam, a tributary of the Ouse. The London and North-Eastern Railway from London passes through Cambridge and Ely. *Ely* is an important junction for Peterborough and Lincoln, King's Lynn and Hunstanton, and Norwich and Yarmouth. *Peterborough,* a cathedral city, stands on the Nen. It manufactures agricultural implements and bricks, and is an important market for wheat. It is on the L. and N.-E. R. main line to the north. The cathedral city of *Lincoln* commands the roads and railways converging upon the gap which it controls. It is a market town and manufactures agricultural implements. The L. M. S. Railway passes through *Bedford* and *Kettering.* The former stands near the navigation limit of the Ouse, and is a market centre with engineering and straw-plaiting industries. *Kettering* has boot and shoe factories. *Northampton,* the chief British town engaged in this branch of the leather industry, stands near the navigation limit of the Nen and just off the main L. M. S. line from London to Crewe, a disadvantage for which the town is itself to blame.

EAST ANGLIA.

East Anglia lies east of the Fens and is a part of the London Basin. It is drained by the Bure, Yare, Waveney, Stour, Colne, Chelmer and Crouch, and contains the greater part of the counties of Norfolk, Suffolk and Essex. Much of the land has been covered by a thick sheet of boulder clay left behind by the melting of the ice sheets of the Great Ice Age. In places, particularly in the east of Norfolk and Suffolk, the surface is undulating, owing to the presence of morainic mounds and low hills, which were also left behind by the ice sheets. Formerly the clay areas were densely forested, especially in Essex, where remnants are still seen in Epping and Hainault Forests. In early times, East Anglia, with the Fens on the west, and the Lea Valley swamps and the Essex forests in the south, was isolated from the rest of England, but easy of access from the sea. Thus, when the Angles and Saxons entered by the Yare, Stour, Colne and other river gateways, they found themselves in a region in which they could develop that distinctive individuality which in later centuries was destined to make their descendants the pioneers of many movements for civil and religious liberty.

Along parts of the coast of Norfolk the sea is busily engaged in the work of erosion, but in others the débris thus produced is being carried by tides and currents and dumped to form coastal gains. Thus waste materials from the soft cliffs of boulder clay and sand are swept southwards and have assisted in the silting of the mouths of the rivers, particularly of the Yare. It is very probable that this river had once a great estuary extending to Norwich. This estuary has been partly filled by the silt of the Yare and its tributaries, and this, combined with the silting of the mouth, has caused the river to flow sluggishly through shallow lagoons, meres, or lake-like expansions known as *The Broads.* These are bordered, sometimes overgrown, with reeds and willows, and abound in water plants, fish and many kinds of water fowl, so that they are a paradise for those holiday-makers who prefer a peaceful holiday spent in boating, fishing or shooting.

OCCUPATIONS AND CITIES OF EAST ANGLIA.

The climatic and soil conditions resemble those of the Basin of the Wash, so that there is a similarity of occupations. The boulder clay plains produce large crops of wheat, the sandier soils are noted for barley, whilst root-crops such as potatoes and turnips, and peas and beans, as well as strawberries and other small fruit, are widespread. In addition, the close contact with the North Sea and its rich fishing grounds has led to the development of great fishing centres, of which *Yarmouth* and *Lowestoft* are the chief. Both are noted for the enormous number of herrings landed there every year. The curing, smoking, packing and despatching of these finds employment for large numbers of people. Yarmouth Harbour, the safest open roadstead between the Thames and the Humber, is protected by huge sandbanks which lie about four miles off the coast. These have been built by the currents from the waste of the coasts. Between them and the coast are the protected waters known as Yarmouth Roads. Other coast towns of importance are *Cromer, Felixstowe* and *Harwich.* The first two are holiday resorts, owing much of their popularity to golf courses among the sand dunes. Harwich, at the entrance to the Stour estuary, is a modern packet station with important continental connections, especially with Flushing, Hook of Holland, Esbjerg, Hamburg and Antwerp.

Norwich and Ipswich, the two largest towns of East Anglia, are both associated with river estuaries and a sea trade of past centuries. *Norwich* retains some of its old importance in the manufacture of wool and silk. It also manufactures boots and shoes, agricultural implements, starch and mustard. It is a cathedral city. *Ipswich,* at the head of the Orwell estuary, is a great wheat market and manufactures agricultural implements. *Colchester* and *Chelmsford* are market centres, the former also being noted for the oyster-beds of the river Colne upon whose banks it stands. Both of these towns, like others in Essex, are built on glacial beds of the river Colne upon whose banks it stands. Both of these towns, like others in Essex, are built on glacial sands or gravels where water collects above the underlying sheets of impervious clay. Thus a drier and healthier site and a supply of water are assured.

The London and North-Eastern Railway serves East Anglia. Two lines run from London to Yarmouth, the first passing through Cambridge and Norwich, the second through Chelmsford and Colchester to Ipswich, where the line divides, one branch going to Norwich, the other to Yarmouth. These lines and their branch connections bring East Anglia into close connection with London, so that the agricultural and market-gardening produce of the inland areas, the fish of Yarmouth and Lowestoft, and the mails and passengers from Harwich reach the Metropolis with little delay.

EXERCISES.

1. Describe a chalk down; a fen country; a rich clay plain. Show what connections exist between the physical and climatic conditions on the one hand and the occupations of the people on the other.
2. What geographical reasons can you give for the prominent part East Anglians have often played in religious and political movements?
3. Draw a map of the mouth of the Alde. Originally the mouth must have been at Aldeburgh. In the sixteenth century it was at Orford. Account for these changes. Also find out about the structure of Lowestoft Ness, and of the extensive coast erosion at Dunwich.
4. Compare the relative importance of Hull, Grimsby, Yarmouth and Lowestoft as fishing centres.
5. Describe the leading features of the British North Sea fishing industry.
6. Find out all you can about the new iron-mining area at Corby (page 231). Corby is now a village, but it is destined to grow into an industrial town with perhaps 30,000 inhabitants. What steps would you take, if you were the designer of the new town, to make it a model industrial centre?

CHAPTER XXIV.

THE SCARPLANDS AND PLAINS OF SOUTH-EASTERN ENGLAND.

II.—THE BASIN OF THE THAMES.

PHYSICAL FEATURES.

THE Thames, the chief river in the British Isles, rises in the Cotswolds, and flows eastwards to its great estuary. The basin may be divided into two portions: the first, or upper part, from the source to the narrow gap where the river passes between the Chiltern Hills and the Marlborough Downs; and the second, or lower part, between that gap and the sea (see Fig. 48). The

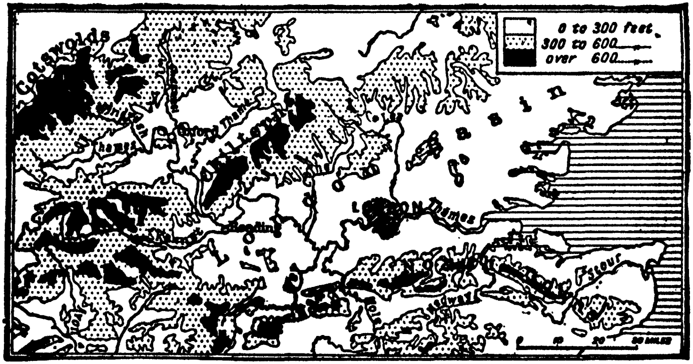


FIG. 48.—The Basin of the Thames.

first forms part of the trough lying between the oolitic and chalk scarplands, and resembles the drier south-western portion of the basin of the Wash, of which it is a southern extension. The second, with East Anglia, forms the London Basin. The clay vales of the upper basin must have formerly stood at the same level as the top of the chalk. When, however, the upper basin was lowered the river began to cut, and later to deepen, a narrow gap through the chalk belt separating the two parts of the basin. This gap is known as the Thames or Goring Gap. In a similar manner the Wey, Mole, and Medway have cut gaps in the North Downs, so that the Thames draws some water from the Weald. In the upper basin the tributaries chiefly come from the Cotswolds, but the Cherwell rises in the oolitic heights further north. Oxford, the famous University city, stands at the confluence of the Cherwell and the Thames. Below Oxford the Thames receives the waters of the Thame, which flows parallel to the escarpment of the Chiltern Hills, and in the opposite direction to the rivers flowing to the Wash. Its direction may be compared with that of the Warwick Avon. After having passed through its gap or gorge the main stream enters upon its lower course, which lies across the London Basin.

Measures of three main kinds fill the trough formed in the great sheet of chalk which underlies the London Basin. Immediately above the chalk are pebbly beds of sands, which appear at the surface along the fringes of the London Basin, and are known as the Reading and Woolwich Sands. On the top of this lies the great cap of London clay, whilst in several places where the clay stands relatively high it is capped by sands (Bagshot Sands) younger than the clay. The most extensive area of Bagshot Sands lies in the western part of the London Basin south of the Thames. From Aldershot it extends almost to Windsor. In other places it is found in small patches, *e.g.* Hampstead Heath.

The first of the tributaries received by the Thames after leaving the Goring Gap is the Kennet, a long tributary from the Marlborough Downs. Reading lies at its confluence with the Thames. Other tributaries are the Lea, which rises in the northern Chilterns and flows across a very low, marshy valley, and the Wey, Mole and Medway, all of which pierce the North Downs and reach the right bank of the Thames.

The Thames estuary is the best natural approach to the interior of England. The rise and fall of the tides are felt as far as Teddington Weir, whilst the spring tides at London Bridge exceed 20 feet. The estuary lies opposite the mouths of the Rhine, the chief river of the Continent, and this fact has increased the commercial importance of both rivers.

A political map will show that the Thames forms a county boundary throughout the greater part of its course, probably due to the fact that it very early became a boundary between those invaders who approached the river from the north-east, and those who landed on the south coast and then gradually pressed inland. That they did not take the natural line of entry, *i.e.* the river, was due to the strong fortress of London which barred the way.

OCCUPATIONS OF THE THAMES BASIN.

Naturally, the characteristics of the different kinds of soils are utilized by man and help to fix the leading occupations. The limestone and chalk ridges support large flocks of sheep. Therefore we find many small manufacturing centres, *e.g. Witney,* west of Oxford, which has a blanket industry. In the Chilterns the presence of considerable beds of clay and sand lying on the chalk has given rise to the growth of small woods, in which the beech is largely found. This encouraged the establishment and growth of chair-making at *High Wycombe.* The sandy districts are not as a rule fertile, and where not pine-forested, are usually heathlands, *e.g.* Blackheath, Aldershot (hence its availability for a military training camp), Hampstead and Bagshot Heaths. In the river valleys, where there are frequently plains built up of alluvium deposited by the rivers during floods, and in the wetter parts of the clay lands, we find rich pastoral meadows, where dairy-farming is carried on, *e.g.* at *Aylesbury,* in the upper basin, and in the Kennet valley, where *Devizes* is a centre for Wiltshire bacon. The drier clay lands are ploughed and are devoted to the production of wheat, oats and barley, as well as to enormous quantities of green vegetables and root-crops, which find a ready sale in the London markets. Associated with the agricultural industries are the brewing and biscuit trades of *Reading* and the straw-hat making of *Luton.* Most of the straw for the latter industry is now imported already plaited from Italy and elsewhere.

LONDON.

We have already noticed that the mouth of the Thames lies opposite to the mouths of the Rhine, the greatest continental river, and that the high tides of the river very considerably help its navigation. They also compel the provision of great docks. London itself grew up at the first point from the mouth at which a bridge could be placed across the river, for below that point, *i.e.* at London Bridge, the river was margined by broad flats over which the waters spread at high tide, whilst at that point the banks were high and dry, and firm enough for bridging purposes. Besides this, this point was the limit of ocean-going navigation, for at Westminster, a little further up the river, there was a ford. Thus grew up the first crossing-place, and before long, roads radiated from it to all points of the compass, so that around the meeting-place grew, not only the political and trading centre of the country, but the greatest city in the whole world. Until the days of coal and iron, and the rise of the Midland and Northern manufacturing districts, London was the only really large city in the country, and it drew its wealth from what was then the wealthiest part of England, *i.e.* the rich agricultural lands of the south-eastern quadrant of England and Wales. Even the rise of Liverpool, Manchester, Birmingham and other great cities has not shaken its supremacy, for the country's main railway communications converge upon it, and thus not only make it easily accessible from all parts, but inevitably add to its importance.

London's position in south-east England at no great distance from the Continent makes its approaches of great military and naval importance. Chatham at the mouth of the Medway, Sheerness on Sheppey Island, and Portsmouth on the south coast, are so placed as to protect the capital from attacks from east and south. The packet stations of Newhaven, Folkestone, Dover, Queenborough and Harwich are largely of importance because they lie on the routes between London and different parts of the Continent. Even Southampton is to a very considerable degree really an out-port of London, whilst watering-places like Brighton, Hastings, Deal, Margate, Southend, etc., derive the greater number of their patrons from the metropolitan area.

The Port of London receives about one-third of the total imports of Britain and sends out about a quarter of the exports. The imports include wheat and meat from the United States and Argentina; tea from China, India and Ceylon; dairy produce from Sweden, Denmark and Holland; mutton and wool from Australia and New Zealand; timber from the Baltic countries; silk from China and Japan; ivory and rubber from the Congo, etc. The exports are largely machinery, hardware and textiles. London is also a manufacturing centre for iron goods, furniture, clothing, chemicals and railway plant. It is not generally realized that London, despite its distance from coal and iron, is the largest engineering centre in Britain; that the number of Londoners dependent upon the leather industry exceeds the population of Leicester or Northampton, and that the printing trade employs more people than there are in Chester.

Routes of the Thames Basin.

London is the great dominating factor. Railway lines radiate from it like the spokes of a wheel (Fig. 49), and all, except those striking north-east along the East Anglian coast, or south-east along the plain between the North Downs and the river, have to cross the chalk scarplands at no great distance from London. Of these the Chilterns barrier is the most important, because it has to be surmounted by most railways. Fortunately both here and in the North Downs there are many river or water gaps (*e.g.* the Thames Gap followed by the Great Western Railway, the Lea Gap followed by the L. M. S. Railway, the Dorking Gap used by the Southern Railway), as well as wind gaps, so called because they no longer contain rivers (*e.g.* the Chiltern gaps controlled by High Wycombe, Berkhampstead, etc.).

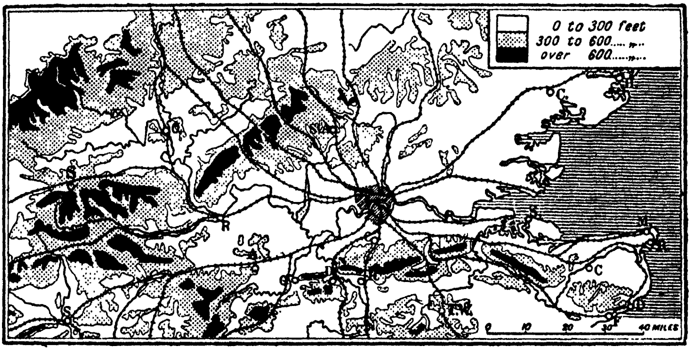


Fig. 49.—The Railway Lines which converge upon London.

The Great Western main line follows the Thames, and passes north of *Windsor,* which has grown round a royal castle built majestically upon a great rock of chalk lifted high above the river. At *Reading* the line forks, one route proceeding along the Kennet valley via Newbury, either to Devizes, Bath and Bristol, or to

Taunton and south-western England; the other via the Thames Gap, either to Oxford, Banbury, Leamington and Birmingham, or, passing along the northern margins of the Marlborough Downs, to Swindon, where the Great Western Railway engineering works are located. Proceeding westwards the latter line forks before reaching Bristol, one line entering that city, the other proceeding to the South Wales coastal plain and Fishguard via the Severn Tunnel.

EXERCISES.

1. What are longitudinal and transverse valleys? What are water gaps? Wind gaps? Illustrate your answer from the Thames Basin.
2. Explain in detail the geographical advantages of the site of London, both in the past and in the present. What is meant by the "Port of London"?
3. Draw a large scale map of the Chilterns, marking very carefully the railways which cross them, the gaps which the railways utilize, and the towns which control them.
4. Discuss the advantages of the site of Aldershot as a permanent military camp. How is it related to Southampton and Portsmouth on the one hand, and to London on the other?
5. Find out the various means by which London is supplied with water. Which source is diminishing? Why?
6. "London is one of the principal manufacturing centres in the country." Discuss this statement.
7. Examine the statistics of the Census of 1931. How does the London area compare as regards changes since the 1921 Census with the older manufacturing areas of the Midlands and the North?

CHAPTER XXV.

THE SCARPLANDS AND PLAINS OF SOUTH-EASTERN ENGLAND.

III.—THE WEALD AND THE HAMPSHIRE BASIN.

THE WEALD.

LONG ago a great sheet of chalk, several hundreds of feet thick, covered S.E. England and extended further west than the present Marlborough Downs–Chilterns–East Anglian Heights escarpment. It also spread out over the adjoining parts of the Continent. This vast chalk sheet was thrown into great up-and-down folds, of which the present Weald was the arch of an anticline or upfold, and the great dips of the strata below the Channel to the south and the London Basin to the north, complementary synclines or downfolds.

Now it is clear that the original rivers would run from the axis or crest of the arch either to the Thames or to the English Channel, and that besides cutting valleys they would gradually lower that part of the arch most subjected to denudation, *i.e.* the top. Eventually the chalk at the crest of the arch would disappear, and as this process continued, the tops of the arches formed by the measures underlying the chalk would in turn suffer denudation, until finally the Hastings sandstone layers would be disclosed. These measures form the Central Weald Heights (see Fig. 50)! Crowborough Beacon, a hill near Tunbridge Wells, is located in the Central Weald Heights. It reaches about 850 feet above sea-level. Formerly the top of the chalk arch stood 3,000 feet higher!

The various measures represented in the Weald were not all weathered at the same rate. The clays, being softer than the chalk, greensand, or Hastings beds, were lowered much more rapidly. Therefore the north and south flowing rivers were compelled to cut gaps in the harder measures in order to maintain their courses, whilst new east and west flowing rivers developed and flowed along the clay vales (see Fig. 51). These latter rivers did not form independent courses, but became tributaries of the original north and south streams. An examination of the map will show that most of the

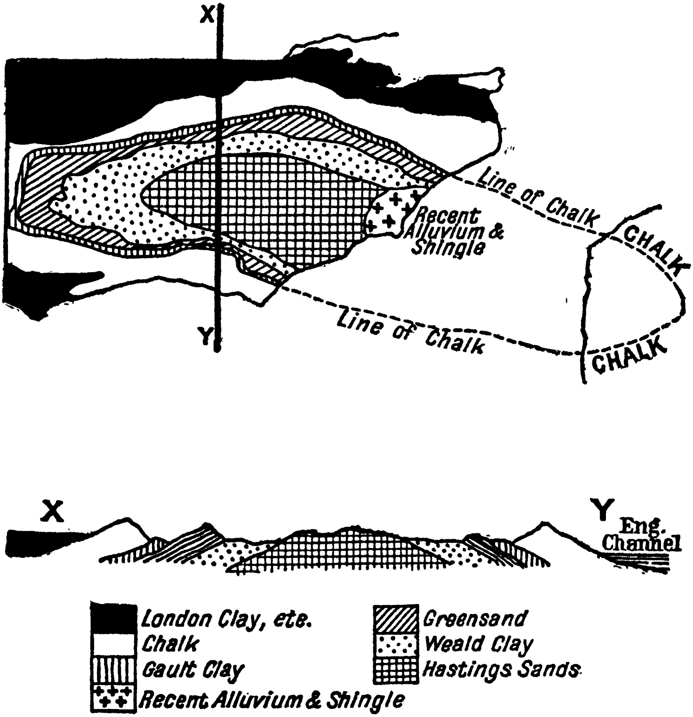


FIG. 50.—Structural map and Section of the Weald.

Wealden rivers have both old (N. and S.) and new (E. and W.) portions, and also that they leave the Weald by gaps which they have cut in the marginal chalk scarplands. In the course of time, the whole region—hard and soft measures alike—will be lowered and the scarps cut back to the level of the downfold of the London Basin, unless in the meantime earth movements interfere with the process.

Fig. 50 gives the Wealden measures as they appear on the surface. It shows that the Weald is a horseshoe-shaped region—a part of an oval which is completed in France—with a belt of chalk on its outer margins, whose steep escarpments look inwards. Inside the chalk, but much more prominent in the north than in the south, is a belt of sandstone with similar escarpments. This in turn gives way to the plain of "bottomless" Weald clay, whilst the central axis of the Weald is formed by Hastings sandstone. Notice the extensive alluvial and shingle deposits near the mouth of the Rother. The alluvium has been brought down by that

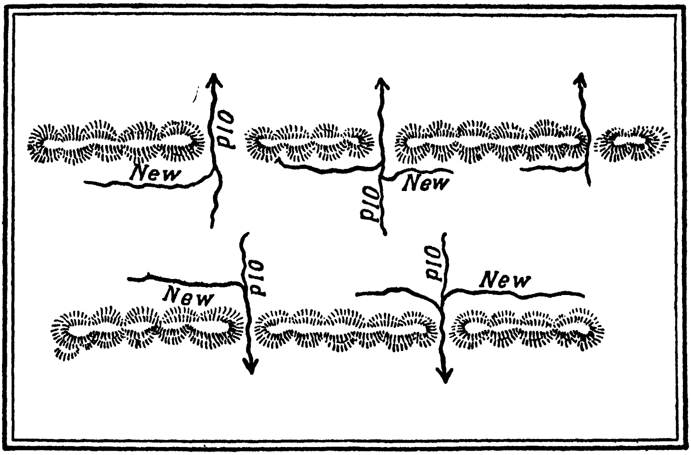


FIG. 51.—Diagram of Wealden Rivers.

river, whilst the heaps of shingle ending in Dungeness have been piled up by the action of the strong tidal currents sweeping up-channel.

OCCUPATIONS OF THE WEALD.

The leading occupations show close connection with the relief and structure. The pastures of the North and South Downs support enormous numbers of sheep, especially those of the South Downs, for considerable areas of the North Downs are covered with clay, so that in their case it is possible to engage in agriculture and dairy-farming, industries of particular importance in view of the proximity to the great population of London. Villages on the Downs themselves are not as a rule very numerous, especially as the difficulty of obtaining water can only be got over by the sinking of very deep wells; but along the foot of the escarpments where the chalk rests upon clay, the water which has percolated through the porous chalk gushes out in springs, and there we find a line of villages. In the great horseshoe of Weald clay which surrounds the Hastings sandstone, and in the narrow clay lands between the foot of the chalk escarpments and the greensand, agriculture is the dominating occupation, and fruit, hops, wheat, root-crops and dairy produce are produced. The sandstone areas—both greensand and Hastings sands—have still many forests, remnants of the vast forests which once covered the whole area, and which were largely cut down to feed the furnaces engaged in the smelting of Wealden iron-ore found in the sandstone. Little or no iron is now smelted in this region, but before the days of coal the Weald was one of the chief iron-smelting regions in the country, and it is very probable that most of the old ironwork found in London and south-eastern England was made there. The low-lying fields of Romney Marsh, near the mouth of the Rother, are pastured by cattle and sheep.

TOWN SITES AND COMMUNICATIONS.

We have already seen that one common site for a village or township is where the springs gush out at the foot of the chalk escarpments. Other villages with similar advantages are where the sandstone rests upon clay. Another obvious site is either in or close to a wind or water gap in the chalk hills. Thus we have, in the North Downs, Guildford (Wey), Dorking (Mole), Redhill (wind), Rochester and Maidstone (Medway), and Canterbury and Ashford (Stour): see Fig. 52. In the two last-mentioned examples, the first town lies north of the gap, the second to the south. In the South Downs, Winchester (Itchen), Chichester (wind), Arundel (Arun), Brighton (wind), and Lewes (Ouse) are the chief gap towns. In every one of these examples, except in the case of the Arun, the gaps are followed both by road and rail, although in a few cases it was necessary to construct tunnels. In the Arun Gap the lowland is too badly drained to make the construction of an important road possible. Pevensey, Rye and Winchelsea are built on sandstone "islands" rising above flat lands.

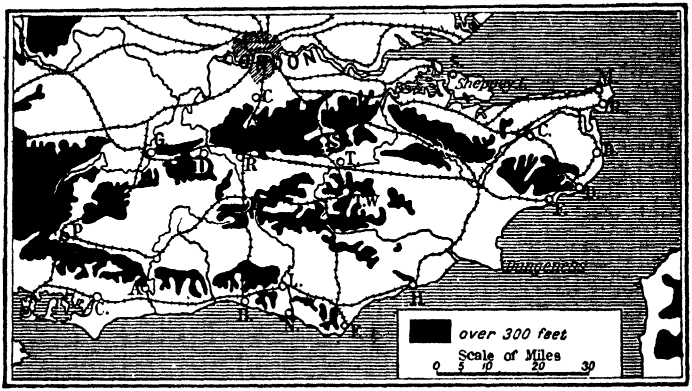


FIG. 52.—S.E. England. Relief and Routes.

Formerly they were ports, but the silting up of river mouths has made them inland towns.

Along the coast there are many watering-places which are largely dependent upon London for support. Brighton, the largest holiday resort in Britain, Eastbourne, Hastings, Folkestone, Ramsgate and Margate are the chief. *Dover,* the nearest English town to France, is only 21 miles from Calais, but the sea-passage between the two is not always of the happiest, owing to the strong tidal currents. Besides being a packet station for Calais and Ostend, Dover is also a great naval base; and, if in the future the Kent coalfields should prove to be rich, there is no reason why it should not become a great commercial port. The boring of the long overdue Channel Tunnel would certainly increase its importance. *Folkestone* and *Newhaven* are also packet stations, with connections with Boulogne and Dieppe respectively.

It is obvious that the main lines of communication will run either east and west, following the direction of the escarpments, or north and south, striking through the gaps. Thus the Southern Railway from Reading to Dover enters the Weald at Guildford, and after traversing the plain at the foot of the chalk escarpment as far as Reigate, it follows the Weald clay to its destination, passing through Tonbridge, an important junction for the Hastings line. Similarly, the line from Hastings to Portsmouth runs from east to west, at first along the clay vale, but after Brighton along the gentle dip-slope of the chalk.

Contrasted with these lines, those giving connections between London and the south and south-east coast run north and south utilizing the gaps. Thus, the London–Portsmouth route uses the gaps at Guildford and Petersfield, and the Brighton route, either the Dorking Gap, or the more direct route via the Merstham Tunnel, which lessens the gradients on the route via the wind gap near Redhill. The latter line reaches its destination via the wind gap in the South Downs behind Brighton. The packet station of Newhaven is reached by the Ouse Gap commanded by the ancient town of Lewes. The lines to Hastings and Folkestone make use of the Sevenoaks Gap in the North Downs. They branch at Tonbridge, the Hastings line passing through *Tunbridge Wells,* an inland holiday centre with medicinal springs, situated in the hilly country of the Central Sandstone heights. The Folkestone line between Sevenoaks and Folkestone lies along the Weald clay Vale of Kent.

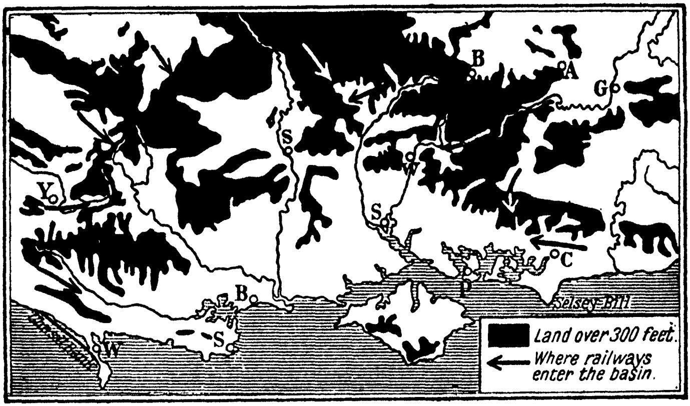


FIG. 53.—The Hampshire Basin.

THE HAMPSHIRE BASIN.

The Hampshire Basin, which includes the Isle of Wight, lies south of Salisbury Plain, and extends from the Dorset Heights in the west to the South Downs in the east (see Fig. 53). Its geological features repeat those of the London Basin, for it is a great trough of chalk filled with clay and sands. The chalk of Salisbury Plain and of the Dorset and South Downs dips beneath the younger clays and sands and reappears in the Downs of central and southern Isle of Wight. The lowest part of the basin, corresponding to the line of the Thames in the London Basin, is occupied by arms of the sea, the Solent and the Spithead, for extensive sinking and wear and tear of the coast have taken place. Formerly the Solent and the Spithead were parts of the valley of the Frome river, and the old coastline probably was as shown in Fig. 54. The chalk ridge of the Isle of Wight is undoubtedly a continuation of the chalk ridge of Dorset

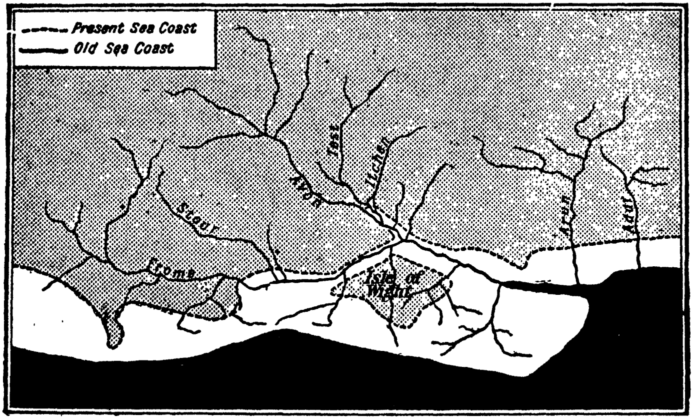


FIG. 54.—The former coastline of the central part of Southern England.

which reaches the sea between Swanage and Poole Bay. This is emphasized by the Needles, isolated pinnacles of chalk in the extreme west of the Isle of Wight. The Dorset chalk ridge just mentioned forms part of the so-called Isle of Purbeck, a beautiful district where ridges of chalk and limestone run parallel to the sea. At Lulworth a belt of hard rocks faces the sea. The famous bottle-necked Lulworth Cove has been made by the breaching of these hard rocks by the sea, which then ate into the softer measures behind. In the same way the sea breached the chalk belt which once joined the

Isle of Wight to the mainland, and swept away the softer materials behind it (see Fig. 25). West of the Isle of Purbeck is the island of Portland, which has been tied to the mainland by the shingle Chesil Bank, or Beach, built up by the action of the tidal currents. Portland Island is composed of oolitic limestone, which is frequently exceedingly good for building purposes. It is quarried by convicts quartered at the great prison located on the island. Stone-quarrying is carried on in many places in the oolitic scarps, *e.g.* Bath, Cheltenham, and Ancaster (Lincolnshire). Oolitic limestone has the great advantage of being readily shaped by cutting with a saw.

OCCUPATIONS OF THE HAMPSHIRE BASIN.

A very important difference must be noted between the occupations of the chalk, the clay and the sand areas. The chalk downs and the upland of Salisbury Plain form, on the whole, not only poor agricultural lands, but are also very poor in useful minerals. *Salisbury Plain* resembles a low plateau, and in parts presents a very level appearance, especially in the vicinity of Stonehenge, perhaps the oldest human monument existing in the country. On the higher parts the soil is generally very thin and poor, trees are very rare, and the land is of little value except for the rearing of sheep. These features, however, make the Plain a splendid ground for the training of armies, and for this purpose it is very extensively used. But the larger river valleys often contain rich deposits of alluvial soil, which make it possible for dairy-farming and agriculture to be carried on.

The sand areas are usually covered with heath or are forested. *The New Forest* is a typical sandy region. It lies west of Southampton Water and contains not merely forests of oak and pine, but also open stretches of heathland and grassland. Although the existing forests of both the Hampshire Basin and the Weald are on sandy soils it must not be supposed that these soils always supported the densest forests. Indeed, it is almost certain that the clay lands were formerly much more densely forested than the sandy lands. In the New Forest the rearing of ponies and swine is carried on.

The clay areas, and also many sandy districts, are rich agricultural and pastoral lands, whose products resemble those of the clay vales of the Weald. Thus, fruit, wheat, root-crops and dairy produce are all important. So mild is the climate of the Isle of Wight, so luxuriant the natural vegetation, and so productive the soil, that the island is frequently called "The Garden of England." It is visited annually by large numbers of holiday makers, who form an important source of wealth. *Cowes,* famous for its regatta, stands on the Solent, opposite Southampton Water. It has a small shipbuilding industry. *Ryde, Sandown, Shanklin* and *Ventnor* are noted holiday resorts. *Newport* occupies a central position at the head of the broad estuary of the Medina. *Bournemouth,* one of the most popular of south-coast holiday resorts, was about sixty years ago a small fishing village. It stands east of Poole Harbour, and owes its rapid growth and popularity to its firm sands, its mild winter climate—for it is especially popular as a winter resort—and its beautiful pine-woods. *Swanage,* like Portland, is famous for its building stone. It is also a holiday resort.

ROUTES AND TOWNS OF THE HAMPSHIRE BASIN.

The natural route from the English Channel into the interior is by way of the Solent or the Spithead to Southampton Water. *Southampton* stands on the piece of land between the mouths of the Test and the Itchen, so that it has a double water-front, whilst owing to the position of the Isle of Wight at the entrance to Southampton Water, the tides come up the Spithead two hours later than up the Solent, so that the port has the great advantage of having double tides daily. This has the effect of prolonging the period of high tide, and prevents the water from falling very low, thus making

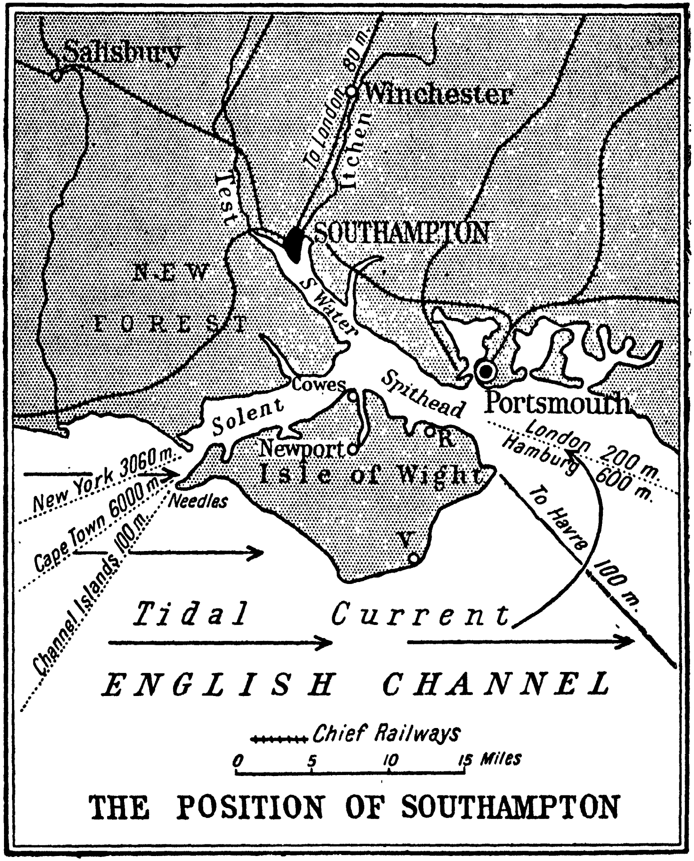


FIG. 55.

the harbour peculiarly accessible to ships and giving it a great advantage over other ports, particularly London. In many ways, especially for mails, passengers, and such valuable African products as gold and diamonds, Southampton is really an out-port of London. Owing to its position with regard to the great military training camps of Aldershot and Salisbury Plain, it is also an important military port. The principal destinations of ships using Southampton port are indicated on Fig. 55.

On Spithead, at the entrance to an almost landlocked harbour, stands *Portsmouth,* the chief British naval dockyard. The town became a royal dockyard in Tudor days, when ships were built of wood, and, despite the fact that it is far from coal and iron fields, and that it is not on the coast which is now most in danger of attack, the start it received has enabled it to maintain its position. Notice on Fig. 55 the sheet of water east of Portsmouth and west of Hayling Island. This is known as Langstone Harbour. For many years schemes have been considered to develop this harbour as a commercial port, but nothing has yet been done. From Southampton Water three main routes lead into the interior (see Fig. 53). The first strikes westward to the Frome valley and *Dorchester,* the second north-westwards to *Salisbury,* and the third north-eastwards to *Winchester.* All three of these towns lie in gaps in the chalk at the point where their respective rivers leave the chalk uplands for the lowlands of the Hampshire Basin. Salisbury, upon which several rivers and the routes following them converge, has one of the most beautiful cathedrals in the world. Winchester, on the Itchen, was once the capital of England.

Communication between the Isle of Wight and the mainland is maintained from Southampton and Portsmouth. *Weymouth,* sheltered by Chesil Beach, is both a pleasure resort and, like Southampton, a packet-station for the Channel Isles.

THE CHANNEL ISLES.

These islands are all that remain of the former English possessions in France. Physically they are part of

France, from whose coast they are only about ten miles distant. They are composed of ancient, hard rock which has weathered into a very rugged coast with steep cliffs, which together with the dangerous sea currents make landing operations no easy task. Their mild climate, with rain at all seasons, is very suitable for grass, and dairy-farming (Jersey and Guernsey cattle are famous) and the production of early vegetables, tomatoes and flowers have become the leading industries. Fishing, the oldest occupation, is carried on, and surplus fish are extensively used for manure. Jersey, Guernsey and Alderney are the largest islands, and *St. Helier* (Jersey) and *St. Peter's Port* (Guernsey) the chief towns. Many of the inhabitants, who number about 95,000, speak French far more naturally than English.

EXERCISES.

1. Describe the kind of scenery which would be met with on a sailing cruise along the coast from Dover to Brighton. Relate your account to the structure and relief of the land.

2. On the railway line between London and Brighton where would you expect to find (*a*) level stretches of line, (*b*) cuttings or tunnels? Give reasons.

3. Many of the parishes in the neighbourhood of Reigate are long, narrow, north and south strips of country, and include portions of chalk, clay and sandstone areas. Why is this?

4. Draw a map of the Narrow Seas and indicate upon it: (i) the chief cross-channel routes, (ii) a large city to which each of these routes leads.

5. Find the Beaulieu River, which rises in the New Forest and flows into the Solent. Just over a century ago the mouth of this river was one of the most important shipbuilding centres in Britain. Over 20 ships which served with Nelson at Trafalgar (including the *Victory*) came from there. Why was shipbuilding carried on there in days gone by and not to-day?

6. Compare the relative advantages of Southampton and Liverpool for participation in trade with North America in (*a*) passengers and mails, (*b*) goods.

CHAPTER XXVI.

SOUTH-WESTERN ENGLAND.

PHYSICAL FEATURES.

SOUTH-WESTERN England is a peninsula, including the greater part of Somerset, western Dorset and the whole of Devon and Cornwall. The Mendip Hills of North Somerset form a complete upfold of carboniferous limestone separating the Plain of Somerset from the basin of the Bristol Avon. Like the Pennine Chain they contain many caves and other phenomena associated with carboniferous limestone areas. The noted Cheddar gorge was probably formed from a series of caverns worn out by underground streams. The collapsing of the roofs of these caverns has resulted in the formation of a steep-sided gorge. East of the Mendips the oolitic limestone of the Cotswolds is continued through western Dorset to the coast, where it forms Portland Island.

Between the Mendips and the Quantocks, outliers of Exmoor, lies the *Plain of Somerset* (see Fig. 56). This low, flat plain, across which the Parret and other rivers sluggishly find their way to the Bristol Channel, has many points of resemblance to the Fens. It is formed of alluvium and was once in a swampy, water-logged state. The historic Isle of Athelney, where Alfred the Great sought a refuge, may be compared to the Isle of Ely, the Fenland refuge of Hereward the Wake. It stands only a few feet about the general level of Sedgemoor, and in Alfred's time must have been surrounded by an almost impassable swamp.

The rest of south-west England falls very naturally into a series of belts of high ground alternating with belts of lowland. Exmoor and the Blackdown Hills form a high belt, succeeded by the Plain of Devon, which stretches from Barnstaple Bay to the mouth of the Exe, and is drained north-westwards by the Torridge and the Taw and south-eastwards by the Exe. A second high belt reaches from Hartland Point to Start Point, attaining its greatest elevation in Dartmoor. Then follow the lowlands of the Tamar, which are succeeded in turn by the highland of Bodmin Moor. The rest of the peninsula may be regarded as another lowland area.

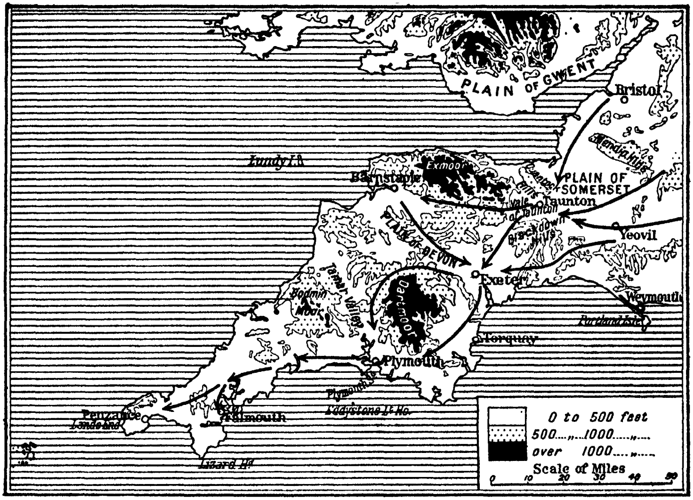


FIG. 56.—Relief and Routes of South-West England.

South-west of an irregular line from the Quantock Hills to the mouth of the Teign the rocks are very old—all older than coal—and mostly very hard. The most prominent features are formed either by the slates, limestones and sandstones of Exmoor, or the granite of Dartmoor and Bodmin Moor. *Dartmoor,* the most extensive mass of granite in England, is a plateau whose highest points just exceed 2,000 feet above sea-level. Yes Tor (2,028 feet) exhibits a common Dartmoor feature. The joints in the granite are very widely separated so that it splits and weathers into large, tabular-shaped blocks called Tors, of which there are over one hundred and fifty on Dartmoor alone. Although granite is one of the hardest of rocks, it is readily disintegrated by rainwater containing carbonic acid acquired from the air. This acts upon feldspar, one of the constituents of granite, dissolves it, and then sets up the decay of the rock and finally reduces it to a stiff clay, the famous kaolin or china clay. This clay is of considerable commercial importance, but it has the harmful effect of keeping the surface sufficiently damp for the formation of bogs. Even in this connection, however, we must note that it is the boggy character of the moor which makes it a suitable place for the establishment of a great convict settlement, for escape is exceedingly difficult. Bodmin Moor is less extensive and lower in height, but it repeats the main features of Dartmoor.

Towards the south-west the peninsula becomes lower, and ends in the granite cape of Land's End and the rarer igneous rock, called Serpentine, of the Lizard. About twenty-five miles further south-west the peninsula reappears in the *Scilly Isles,* a group of some 150 granite islands and rocks, of which only five are inhabited. The sinking of south-western England has drowned the lower valleys of most of the rivers, producing the magnificent rias of Falmouth and Plymouth Sounds (*cf.* Kenmare River, Dingle Bay, etc., in south-west Ireland). But although there is evidence of extensive sinking, there is also reason to believe that at times uplift has also occurred in certain places, for the presence of raised beaches and shelves, cut into the land by the action of the waves when the land stood at a lower level, bear witness to this.

Lundy Island, an isolated volcanic island, is an outlier of Exmoor, which probably at one time extended further westwards.

Occupations of South-Western England.

The leading occupations show a very close connection with geographical conditions. *Fishing* is a natural occupation in a region with so many fine harbours. The sailors and fishermen of south-west England have won for themselves a great name in British history. It was from its ports, and particularly from Barnstaple, Bideford, Falmouth and Plymouth, that such great Elizabethan seamen as Raleigh, Hawkins, Drake and Gilbert sailed, either to attack and plunder the treasure-ships of Spain and to defeat her great Armada, or to attempt the founding of English colonies in the New World. To-day, St. Ives and Penzance are centres for the mackerel and pilchard fisheries, and Brixham, on Tor Bay, and Falmouth are centres of the trawl-fishing industry.

In the highland areas there is much waste land, particularly on the granite moorlands and on Exmoor. Mining, quarrying, the exporting of kaolin, and the rearing of animals are the chief occupations associated with the highlands. Mining for tin and copper has been carried on from time immemorial, the mines having been visited by Phœnicians, Greeks and Romans. Very little tin and only a comparatively small amount of copper are now obtained, as most of the lodes and veins which formed in the cracks on the margins of the great granite masses have been worked out. At Truro, St. Just (west of Penzance), and at Bodmin, the county town of Cornwall, these ores are still mined and sent to South Wales to be smelted, although a small amount is smelted by coal brought from South Wales. Granite and slate are extensively quarried and exported, whilst kaolin is exported by sea from Fowey and Teignmouth to the Mersey, where it is chiefly sent by canal to the Potteries, but also to the cotton mills of Lancashire. Hardy ponies run wild on Exmoor and Dartmoor, and are sold, happily in decreasing numbers, for work in coal-mines. Sheep-rearing is associated with the Mendips and the hills of the oolitic " streak " to the east, and in both cases small woollen industries have been fostered, in the first case in the Frome valley, and in the second at Axminster, although Axminster carpets are now largely made elsewhere.

But, despite the large extent of waste land, south-western England is essentially agricultural. Its lowlands, and particularly the Plains of Somerset and Devon and the Vale of Taunton, are suitable not only for the growing of fruit and cereals, but also for dairy-farming, facts which are borne out by the fame of Cheddar cheese, Devonshire cream, Devonshire cider, etc. The richest part of the Devonshire Plain is the New Red Sandstone vale of the Exe, noted for its red cattle and its red cider apples. The southerly position and the oceanic influences which are everywhere felt make southern Cornwall and the Scilly Isles exceedingly suitable for the cultivation of early flowers (narcissi, daffodils, lilies, etc.) and vegetables, especially potatoes, asparagus, etc. The prices obtained for these early products are so high, that it is easily possible to bear the cost of railway transit to distant large centres of population.

There is another industry which probably ranks first in point of the numbers dependent wholly or partially upon it. It is the catering for the needs of the large numbers of visitors who are attracted to the south-western peninsula, either on account of its mild climate or the magnificent coast and inland scenery. The mild winters make the Cornish and Devon coasts very well suited for invalids, and many coastal towns have become famous winter health resorts, particularly *Torquay,* on Tor Bay. On the coast of North Devon, the magnificent coastal scenery along the margins of Exmoor, and the beauty of the wooded glens which open from that heather-clad tableland to the sea, have made *Ilfracombe, Lynton,* and other smaller places very popular summer resorts.

TOWNS AND ROUTES OF SOUTH-WESTERN ENGLAND.

Before the drainage of the Plain of Somerset south-western England was almost cut off from communication with the rest of England, except by sea. Three main railway lines enter the peninsula. From Bristol and the lower Severn basin on the one hand, and from the valley of the Kennet and the lower Thames Basin on the other, two lines, both belonging to the Great Western Railway, converge upon Taunton after having passed round the western and eastern margins of the Mendips. *Taunton,* a very important west-country route centre, stands on a tributary of the Parret in the vale of Taunton, a fertile lowland lying between the Quantock and Blackdown Hills. A branch line runs to Barnstaple, Bideford and Ilfracombe. The main line proceeds to Exeter along the plains between Exmoor and the Blackdown Hills. There it meets the Southern line, which takes the route south of the Blackdowns. *Exeter,* a Roman city, stands at the head of the estuary of the Exe, a position which commands many routes (see Fig. 56). It is the county town of Devon, and is sometimes spoken of as the Capital of the West Country. Proceeding south-westwards from Exeter, the great mass of Dartmoor presents such an obstruction that the Southern Railway follows its northern margins and sends an offshoot to Barnstaple and Bideford, whilst the Great Western Railway line works round its southern borders and sends an offshoot to Torquay. The lines meet again at *Plymouth,* the great naval station on the magnificent sound of the same name. Plymouth, with Devonport and Stonehouse (the "Three Towns"), is the largest, and in many respects the finest, city in south-western England. All traffic passing down the Tamar valley and along the lowlands south of Bodmin Moor and north and south of Dartmoor, converges upon the city. It is a port of call for ocean liners, and is particularly important as a mail port. Out to sea, opposite the entrance to

Plymouth Sound, stands the noted Eddystone Lighthouse. From Plymouth, after crossing the Sound by the famous Saltash Bridge, the joint line proceeds south-westwards through *Truro* to *Penzance*. From Truro a line serves *Falmouth*, an important shipping and trawl-fishing port, situated at the entrance to the beautiful estuary of the Fal.

EXERCISES.

1. Write a brief account of the relief of south-western England, and show how the chief lines of communication are related to relief.
2. Write descriptive accounts of Exmoor, Sedgemoor, Dartmoor, and the coastal scenery of Cornwall. With what other part of Britain may each be compared?
3. Compare the relative merits of Taunton and Exeter to the title the "Gate to the West Country," and of Plymouth and Portsmouth as naval stations and as commercial ports.
4. Why is it that: (i) West-country sailors were so famous in Elizabethan days? (ii) Cornish miners are found in almost all the great mining regions of the Empire? (iii) Cornwall and Devon have so many winter resorts? (iv) The Plain of Devon is called the Red Plain?
5. Draw a sketch map of south-west England, shading the high-ground and inserting the chief railways. Insert the principal rivers and towns and indicate the distribution of tin mining, dairy farming and fishing.

CHAPTER XXVII.

BRITAIN AND THE MODERN WORLD.

We have seen how different from each other the regions of Britain are, and how different in consequence are the lives and occupations of the people. Few people inhabit the mountains and moorlands, where at best the land is suitable only for rearing hardy cattle, ponies and sheep. On the English lowlands and similar lands in Ireland and Scotland farming is carried on and the land is dotted with farms, villages and market towns. The coalfields round the Pennines, in South Wales, and the Central Lowlands of Scotland have on them close groups of large industrial towns manufacturing all kinds of woollen, cotton, iron and steel goods.

Long ago, before the days of railways, motors, posts and telegraphs, each hamlet or town lived almost to itself. Its inhabitants grew or made almost all that they required, and they received and heard little from the great world outside. To-day roads, railways, canals and air routes bind the various parts of Britain together, and people, goods and ideas pass freely from one part of the country to another. In the early days of railways every year saw an increase in the number of short lines. These short lines were later extended until they joined each other, and in time the many short railways were united to form fewer companies, but each was large and important. Once again there has been a uniting of railways, so that now we have the following great companies:—

(1) London, Midland and Scottish Railway.
(2) London and North-Eastern Railway.
(3) Great Western Railway.
(4) Southern Railway.

Fig. 52 shows that the first three radiate from London across the English Plain to the industrial regions of the north and west, with extensions to Ireland and Scotland. These are the great main lines along which goods and

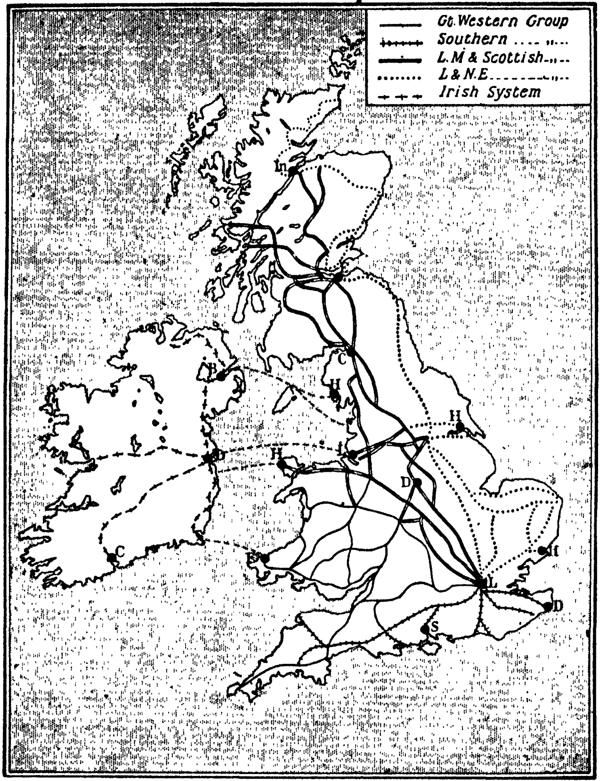


Fig. 57.—The Principal Railways of Britain. This map shows the new grouping of the railways into four main groups.

passengers travel from region to region. On the L. and N.-E. Railway, for example, fish is carried to London and other large towns from Grimsby, Yarmouth and Lowestoft; farm and garden produce from the eastern counties; coal from the York, Derby and

Notts coalfield; woollen goods from the West Riding; machinery from the Tyneside towns; fish and meat from as far north as Inverness. From London there are distributed both the goods which come into the Port of London and those which are manufactured in the capital; tea, sugar, wool, frozen meat, furniture, clothes, newspapers, books, and many other things. Then there is the constant coming and going of people to the great Metropolis, which is the commercial, financial, and political centre of the British Isles. So we might take each railway, canal and motor route in turn and notice the character of the commodities which travel up and down its system. Railways, roads and canals connect the various regions of Britain, but it is the seaways which join her to the rest of the world. The seaways are the chief link of the British Empire and the one great means by which Britain can trade with foreign countries.

British exports are principally manufactured goods. On the coalfields far more cotton, woollen, iron and steel goods are made than are required at home. These are sent to countries where these articles are required, but whose inhabitants either do not make them for themselves, or do not make enough for their needs. Large quantities of coal are also exported, chiefly from the South Wales, Northumberland and Durham, and Fifeshire coalfields.

In return for these exports, food and raw materials form the principal imports. Wheat, flour, meat, bacon, fruits, tea, raw cotton, iron-ore, timber—these are but a few of the many things required. Some, like tea and cotton, cannot be grown in Britain at all; others, like wheat, meat and timber, are produced, but not in sufficient quantities to meet the demand, for forty-seven millions of people live in Britain.

Fig. 58 shows the relation of the British Isles to the Sea that "runneth the earth's wide regions round." To the south and east the Narrow Seas separating Britain from Europe are crossed by steamers which maintain regular mail, passenger and goods services. From France, Belgium, Holland, Denmark and Germany come food-stuffs such as fruit, vegetables, cheese and butter, as well as manufactured goods of iron, steel and silk, and chemicals and glass. From the Baltic lands and Norway come great quantities of timber in the form of pit-props, planks, or even doors, window-frames and staircases.

To the west of Britain is the North Atlantic, once a great barrier to men and now a mere "herring-pond." On the far side are the two British dominions of Canada and Newfoundland, and the large English-speaking, but entirely independent country of the United States. From the United States the most important import is raw cotton, which is grown in the southern states and is required to feed the Lancashire cotton mills. Canada sends wheat, meat, hides and skins, together with timber and paper made from wood pulp. Newfoundland also sends timber and paper, as well as fish and oil.

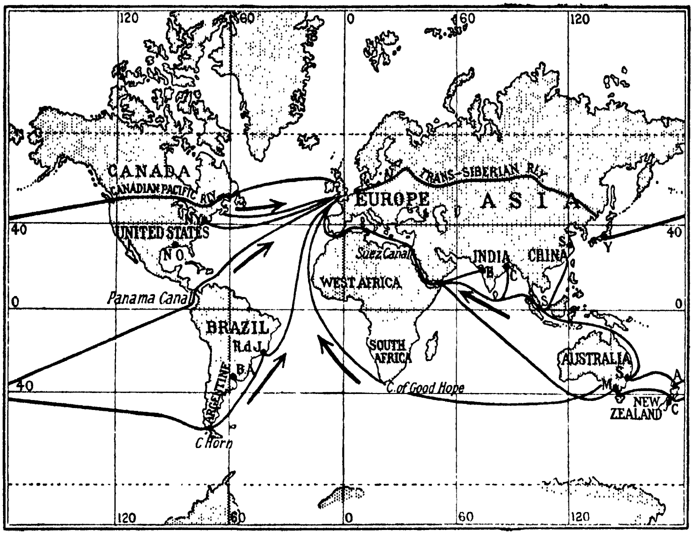


FIG. 58.—The British Isles in relation to the Great Trade Routes of the world.

Four great routes—Suez, Cape of Good Hope, Cape

Horn and Panama—link Britain with the rest of the world and with far distant parts of the Empire. In most of the countries traded with railways have been constructed from the ports to inland districts, so that goods readily pass between the ship and places hundreds of miles in the interior. What is the nature of Britain's trade with these distant lands? They are markets for all kinds of British manufactured goods, *e.g.* railway lines, locomotives and carriages for the countries of South America; woollen goods and machinery for Australia; cotton goods for India and China. From these lands food and raw materials are received, *e.g.* wool and mutton from Australia and New Zealand; tea and silk from China; meat, hides and wheat from Argentina; coffee and rubber from Brazil; copper-ore and nitrates from Chile; mahogany from Honduras; cocoa from the Gold Coast; palm oil and tin from Nigeria. Thus we might go on, giving an ever-increasing list of articles which ships are constantly bringing to this country.

Though but specks on the mighty ocean, steamers are crossing and re-crossing its waters in all directions and form the principal means by which goods are conveyed from one part of the world to another. Nowadays, world air-routes are being planned, and it is possible that one day fleets of aircraft may traverse the air as the ships now sail the seas. And there are other links—the cables and wireless stations, by means of which messages can be sent across the world as easily as the sending of a telegraph message to the next town or village.

Thus to-day and every day we are in touch with the whole world and trade and commerce are helping to break down the barriers between peoples. The negro in Africa grows cocoa to be eaten as chocolate perhaps in Glasgow; Chinese girls pick tea to be made into drink for people living perhaps in London; men in Lancashire make cotton cloth to be worn by people in India or Central Africa, while the men of Derby make boilers, which are sent out to be used in the extraction of sugar from canes grown in the West Indies. We should look upon the modern world as one great unit, one great workshop, one great home of man, in which the men and women of different countries and regions have their own special task to accomplish. Though they may never see each other, they hear of one another, they trade with one another, and steamers, railway-trains, canal-boats, aeroplanes and airships, animals, and in some places even man himself, carry goods from place to place that all may enjoy the work of all.

EXERCISES.

1. Obtain the Board of Trade statistics, giving British exports and imports for a pre-war year and a post-war year. Describe and account for any differences you notice between the two years.
2. Obtain statistics showing the countries with which Britain trades? What proportion of the total trade is carried on with the British Empire?
3. From which parts of the world does Great Britain import (*a*) wheat, (*b*) cotton, (*c*) wool? What does she export to those countries?
4. Draw diagrams to show the relative amounts of British imports falling under the following headings: foodstuffs, raw materials for manufacture, manufactured articles. Use the same years as for Ex. 1 and 2.
5. Arrange the ports of Britain in order according (*a*) to the value of their trade, (*b*) the tonnage of goods handled. Consult the Board of Trade statistical abstracts, or the *Statesman's Year-Book*, for the figures.
6. Which commodities we now import in great quantities from foreign countries could be produced by the Colonies? Give details and discuss the possibilities of colonial developments in the directions you mention.
7. If you have a *Times Atlas*, examine the map "Towns of England and Wales." These town plans will teach you much that cannot be obtained from ordinary atlas maps.

EUROPE

CHAPTER XXVIII.

General Physical and Regional Conditions.

Europe forms the western part of the great land mass of Eurasia, and on purely physical grounds it is closely bound to Asia, but climatically, economically and politically it is clearly marked off from its eastern neighbour. In area, it is the least of all the continents except Australia, and contains about 3,750,000 square miles, which is about one-fourteenth of the land surface of the globe. In latitude, it extends from 35° N. to 71° N., so that it lies almost entirely within the temperate zone, with most of its mass rather nearer the North Pole than the Equator. Its northern shores just reach within the region of Arctic ice and snow, whilst in the south it falls short of the Saharan heat and drought. The northern, western and southern shores of Europe are washed by arms of the ocean, and only on the east are there land frontiers. The position of the Continent with regard to the great sea routes is a matter of first-class importance, for the fact that the sea routes to the Atlantic, to Africa and to the Far East via the Mediterranean pass along its shores has had a great deal to do with the commercial importance of European countries, particularly of those on its western margins.

Relief and Structure.

Considering only the distribution of highlands and plains, without any regard to structure, a glance at the physical map of Europe is sufficient to show that it falls into three main physical divisions. The first of these is the *North-Western Highlands,* found in Scandinavia and in western Britain. A second division is the great belt of the *Southern Highlands,* stretching right across Southern Europe from west to east, including mountain ranges like the Alps and the Carpathians, and plateaus like the core plateaus of France and Spain. The third division is the *Central Lowlands.* In the east this vast lowland stretches from the Arctic Ocean to the Black Sea, but towards the west it narrows in Holland and Belgium, and then turns south-westwards until it abruptly ends at the base of the Pyrenees. But the beds of the shallow Baltic and North Seas are really parts of this lowland, so that it must be looked upon as extending westwards to the mountains of Britain.

A physical map will show that both the central lowlands and the southern highlands are prolongations of the physical features of Asia, a fact which emphasizes not only the physical connections between Europe and Asia but also the peninsular character of the former continent.

Structure.—If, however, we also include in our classification a consideration of the *type* of highlands, whether fold mountains or block-plateau highlands, of the type of lowlands, whether of horizontally bedded sheets of rocks, or of alluvium or glacial waste, etc., it will be necessary to group in rather different fashion. The first great structural division of Europe is the *Ancient North-Western Region,* which includes not only the North-Western Highlands, but also the peneplain of Finland. This region, comprising western and north-western Britain, Scandinavia and Finland, is a very ancient land mass which has been greatly worn down, faulted, sunken and glaciated, both remotely and recently. Along its margins are many lowlands of waste material brought down by ice-sheets, or of alluvium carried by rivers from their sources in the Alps or the highlands of central Europe. Examples of such lowlands are the Netherlands, Denmark, southern Sweden and the North German Plain.

South of this region there lie the *Highlands of Central Europe,* a belt or zone of ancient plateaux and basins, where the greatest complexity exists. To this belt belong the Meseta, the plateau-core of the Iberian Peninsula, the central plateau of France, and the complicated system of highlands in central and southern Germany and Bohemia (see Fig. 59). Some of these highlands are plateaus of upraised blocks of the earth's crust, some are ancient folded mountains which were denuded to a peneplain and then uplifted, fractured or tilted. We shall find that this complicated highland system is very rich in minerals, for the best coal and most ores are encountered in ancient rocks where earth movements and denudation expose mineral deposits and render mining operations comparatively easy.

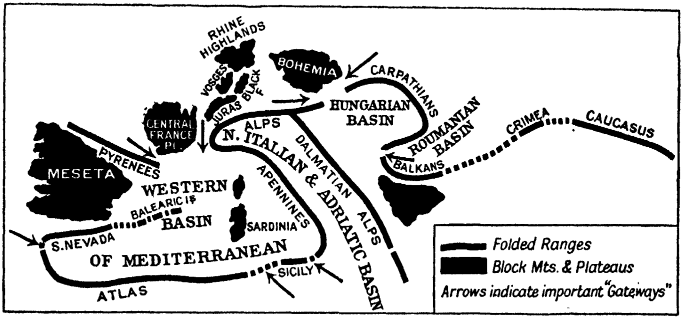


FIG. 59.—The Folded Ranges and Block Mountains of Central and Southern Europe.

The third great structural division of Europe is the *Russian Plain.* This consists of vast horizontal sheets of ancient sedimentary rocks, which for ages have remained undisturbed by the forces which in other parts of the Continent have been at work in altering the face of the land. It is appropriate to notice here that the Urals are structurally connected with the North-Western

Highlands, for the rocks of those highlands pass beneath the sedimentary measures and reappear to form the Urals.

The fourth structural division comprises the *Folded Ranges of Southern Europe.* When the rocks were buckled and crumpled to form these mountains, there must have been extensive subsidences along the fringes of the folds. In this way the depressions of the two basins of the Mediterranean, of northern Italy and of the Hungarian Plain were formed. Fig 59 traces these folded ranges and indicates their connection with the mountain systems of north-western Africa and southern Asia. This great east and west system of folded ranges extending from Spain to China may be compared with the similar system which forms the mountain girdle of the Pacific Ocean.

The fifth great feature of the build of Europe is the *Continental Shelf* of western Europe. To this sufficient reference has already been made (see pp. 130–133).

CLIMATE.

The first things to notice are that Europe lies in the north temperate belt, that it is on the west of a great land mass, and that its coast is so deeply indented and seas penetrate so far into the land, that except in Russia, no part of the Continent is more than 400 miles from the sea. It follows from these facts that, on the whole Europe will have a temperate climate, with oceanic conditions on the west and continental conditions in the east, and that except in summer the whole Continent will lie in the track of westerly winds at all seasons. In summer the southern margins come under the influence of high-pressure conditions, due to the northerly migration of the pressure belts.

Temperature Conditions.—Fig. 60 gives the mean sea-level isotherms for January and July. The bending southwards which we noticed in the case of the January isotherms for the British Isles is still more marked on the Continent. The isotherm of 32° F. should be particularly noted, for that is the temperature at which water freezes. It passes south of Iceland to the north of Norway, and then takes a southerly course to the head of the Adriatic Sea, where it bends eastwards, partly due to the presence of the Mediterranean Sea, partly to the effect of the cold land mass. This clearly demonstrates the influence of the warm waters of the North Atlantic drift, and of the warm south-west winds which blow from ocean to land. As in the case of Britain, winter temperatures fall as we go eastwards away from the warm ocean. In July, the isotherms roughly run from west to east, but there is a marked northerly trend the further east they go, due to the fact that in this month the land masses are warmer than the

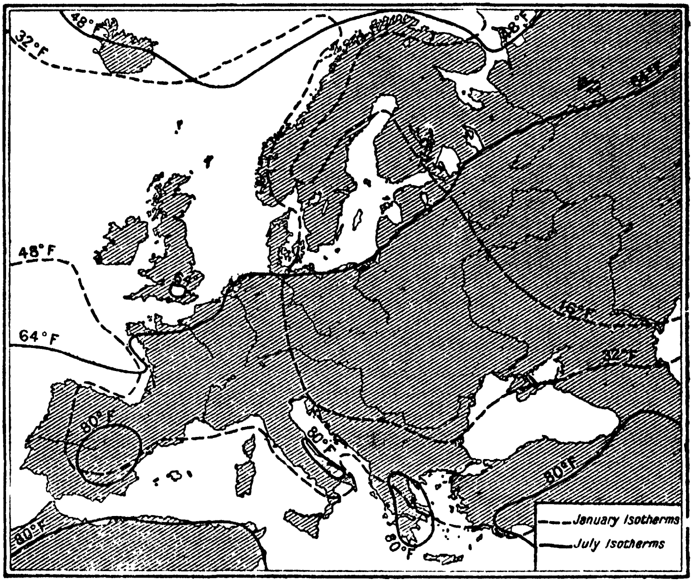


FIG. 60.—Europe: January and July mean sea-level isotherms.

seas in the same latitude. In January, only the extreme south has a mean monthly temperature exceeding 50° F.; in July, only in the extreme north does the temperature fall below this amount. Considering January and July isotherms together, it is evident that both in January and in July the warmest temperatures are experienced in the Mediterranean region, that the least range of temperature is found along the western margins, and the greatest range in the east and particularly the north-east. The relative change of temperature, as distance from the Atlantic Ocean increases (*a*) along a parallel of latitude where there is chiefly land, and (*b*) in the Mediterranean Sea area, is best seen by reference to actual figures.

Place.	Mean January Temperature.	Mean July Temperature.	Mean Annual Range of Temperature.
Valentia . . .	45° F.	58° F.	13° F.
Berlin . . .	31	64	33
Warsaw . . .	24	66	42
Saratof . . .	13	71	58
Gibraltar . .	54° F.	75° F.	21° F.
Palermo . . .	51	76	25
Athens . . .	49	81	32
Smyrna . . .	46	80	34

The first four towns lie approximately in the same latitude, but in winter the temperature very rapidly falls as distance from sea increases, whilst in summer there is an increase in temperature, though the increase is not so much as the winter decrease. Valentia enjoys an *insular* or *oceanic* type of climate, Saratof has an *extreme* or *continental* type, while Berlin and Warsaw have climates marking a transition between the two. The second set of towns are in the Mediterranean region, where, as the figures show, more equable conditions obtain, the summer increase and the winter decrease in temperature being small, owing, of course, to the moderating influence of the sea.

Rainfall Conditions.—If the mean annual rainfall map (Fig. 61) is compared with a relief map, the close connection between the two sets of factors is at once apparent. The rain-bringing winds are the prevailing westerlies, hence the decrease of rainfall as we go eastwards. This is evident not only in mountainous areas, *e.g.* Pyrenees and Caucasus, but in plains, *e.g.* Russian plain. It is particularly in evidence in the case of Britain and Scandinavia, and other places where the highest land is on the western margins and the lowlands on the east. The effect of an encircling chain of highlands is also markedly illustrated in the case of the relatively dry Hungarian plains.

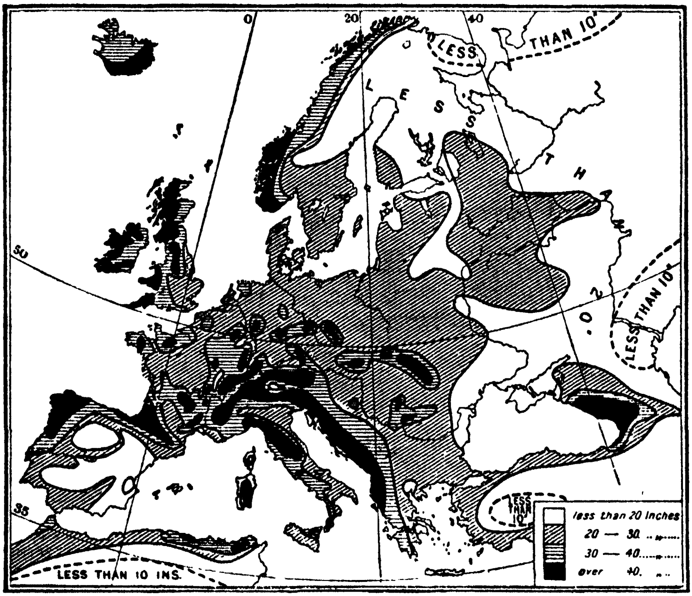


Fig. 61.—**Europe: Mean annual rainfall.**

As regards the seasonal distribution of rainfall, Europe may be classified into three main divisions, as

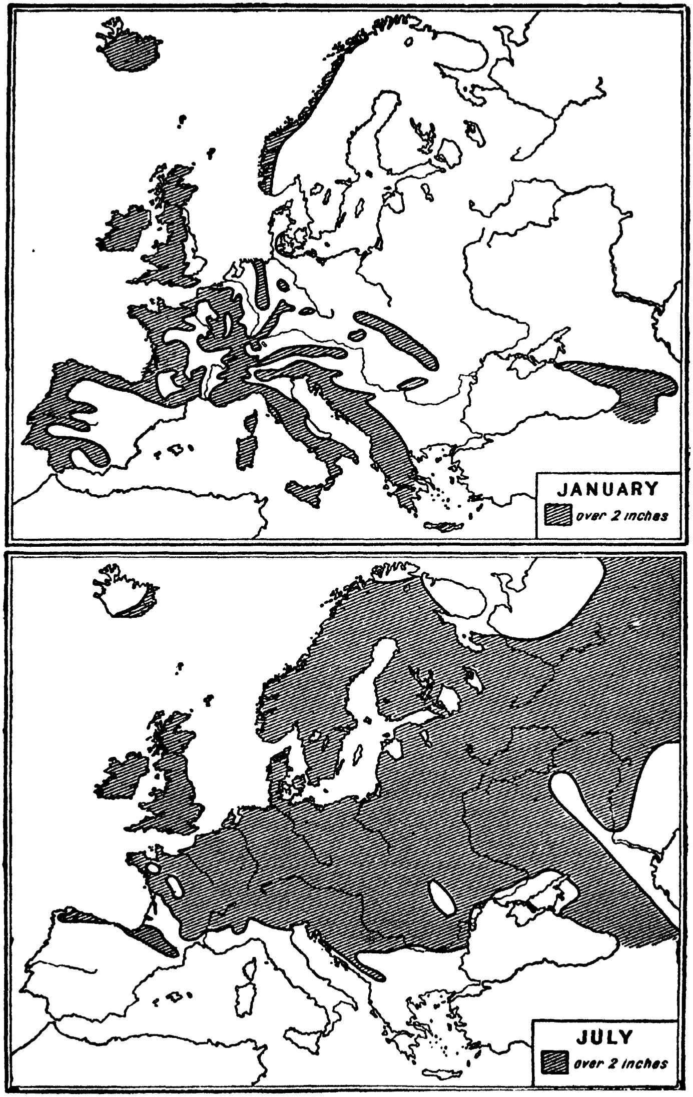


FIG. 62.—Europe: Regions where the mean rainfall exceeds two inches in January and July.

will be seen by comparing the two maps in Fig. 62. In the interior and east of the Continent rainfall occurs chiefly in summer, when moisture-laden winds from the ocean can reach such distances from the sea owing to the low-pressure systems developed over the heated land mass of Eurasia. In winter the cold air cannot contain much water vapour, whilst the winds outflowing from the prevailing high-pressure areas over the lands prevent the ocean winds from reaching the interior of the Continent. Western Europe, from the Cantabrians to northern Norway, is in the track of the prevailing westerlies at all seasons, and therefore has rain at all seasons. There is, however, a slight maximum in autumn. The Mediterranean region has rain in winter, for only at that season is it in the belt of the prevailing westerlies.

NATURAL VEGETATION.

In Europe, more than in any other continent, the natural vegetation has been altered by man, so that over large areas the type of natural vegetation shown on Fig. 63 now only exists in samples. For instances, vast areas of forests have been removed from western and central Europe, and extensive tracts of Hungarian and Russian grassland have long since been ploughed, and in modern times produce rich harvests of cultivated grasses, *e.g.* wheat, etc.

Tundra.—Vegetation of this type is found in the extreme north, where the winters are long and severe, the summers short and warm, and the total precipitation is less than ten inches per annum. Here the ground never thaws below a depth of a foot or so, so that trees cannot grow, and the only vegetation consists of mosses, lichens and small berry-bearing plants and shrubs, such as crowberries and cranberries, which are found along sheltered water-courses. Southward extensions of the tundra are found on the Scandinavian highlands and the Ural Mountains.

The Forests.—Forests of the cool temperate variety stretch right across Europe in a broad belt south of the tundra. In the north the trees are conifers chiefly, pines and firs, for only such sturdy trees could withstand the severe climate. These forests are of great economic value, not only for the timber and the products derived therefrom, but for the furs of the animals which they shelter.

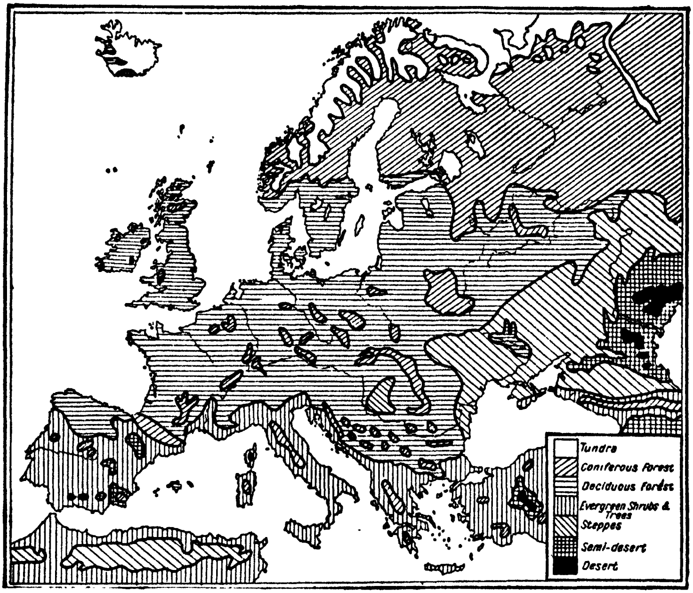


FIG. 63.—Europe: Map of natural vegetation.

Towards the south the conifers give way to deciduous trees such as oaks, beeches, elms, etc. These once formed dense forests on most of the lowlands of western and central Europe.

In the Mediterranean region the forests are of the type found in western margins of warm temperate lands, and may be compared with those of the Atlas region in

Africa. All the trees are evergreens—oaks, walnuts, olives, etc.; and are adapted in some way, *e.g.* by striking deeply, or by the provision of small dry leaves, to withstand the summer drought. Many of the former magnificent forests which clothed the mountains of Mediterranean Europe have been ruthlessly cut down, with disastrous results to the mountains themselves as well as to the adjacent lowlands.

Steppes and Semi-Desert.—In south-eastern Europe the lack of rain, helped in some cases by the porous character of the soil, sets a limit on the growth of trees, and vast stretches of temperate grasslands, called steppes, are found. The climate is extreme and the light rains occur chiefly in summer. On the steppes a wonderful change takes place as the seasons succeed each other. In winter they are white with snow. In spring they are beautiful carpets of flowers, chiefly bulbs which require a long resting season. Later the grass begins to grow, and in early summer the steppes are vast expanses of green; but as summer changes to autumn and the rains cease, the grass withers and the steppes become brown. Vast areas of the wetter steppe are now ploughed and wheat and other cereals are produced; but on the drier steppe the prevailing occupation is the rearing of cattle, sheep, horses and goats, and the type of life is nomadic. Towards the Caspian Sea the rainfall decreases, so that the steppe merges into semi-desert and in places into true desert. The Hungarian Plain—the *pusztas*—is a portion of the steppe cut off from the Russian steppe by the Carpathians.

Mountain Associations.—On the mountains of Europe the vegetation differs according to position and height. Thus, on the northern Scandinavian highlands, the elevation and the high latitude make it impossible for any vegetation other than tundra to exist. Mountains of moderate elevation in Central Europe, *e.g.* the Carpathians, are forested to their summits, whilst the higher Alps and Caucasus lift their heads sufficiently high to stretch beyond the tree limit, through the mountain pastures resplendent in spring with alpine plants, and the zone where vegetation of the tundra type is found, to the fields of everlasting snow and ice.

THE MAJOR NATURAL REGIONS OF EUROPE.

Fig. 64 shows how Europe may be divided into eight major natural regions.

The following table should be referred to in studying the climatic peculiarities of each region. The exact position of each town should be found on the map.

No. of Region on Fig.	Place.	Height in feet above Sea Level.	Mean January Temperature.	Mean July Temperature.	Mean Annual Rainfall in ins.	When Rain falls.
1	Bergen .	50	34° F.	58° F.	68	All seasons.
	Valentia .	16	45	58	60	
	Cambridge	80	38	62	23	
	Corunna .	90	48	64	65	
2	Gibraltar	50	54° F.	75° F.	32	Chiefly in winter.
	Palermo .	220	51	76	30	
	Athens .	350	49	81	14	
3	Vienna .	650	29° F.	67° F.	23	All seasons with summer maximum.
	Belgrade .	450	29	72	24	
	Milan .	480	32	75	40	
4	Davos . (E. Switz.)	5100	19° F.	55° F.	37	All seasons.
	Berne .	1870	28	64	33	
5	Stockholm	150	27 °F.	62° F.	16	All seasons with summer maximum.
	Leningrad	20	17	63	17	
	Berlin .	160	31	64	23	
6	Moscow .	500	12° F.	66° F.	20	Chiefly in summer.
	Perm .	325	2	65	19	
7	Odessa .	200	25° F.	73° F.	16	Chiefly in summer.
	Astrakhan	50	19	78	6	
8	Archangel	50	7° F.	60° F.	14	Chiefly in summer.

(1) *Western Europe.*—This type of region has no counterpart in Africa, for that continent does not reach sufficiently far north or south of the Equator. We are already familiar with its leading features, however, because the British Isles are part of the region. The whole region lies in the track of the westerlies at all seasons, so that the western seaboard has an abundant rainfall, with drier conditions prevailing in sheltered lowlands. The distribution of temperature is very equable, the winters being cool and the summers warm. Close contact with the sea encourages fishing and shipping, a fact which is borne out in the seafaring activities of the British, Dutch, Danish and Norwegian peoples. The natural vegetation is the deciduous or broad-leaved forest with conifers in the colder and higher parts. There are also expanses

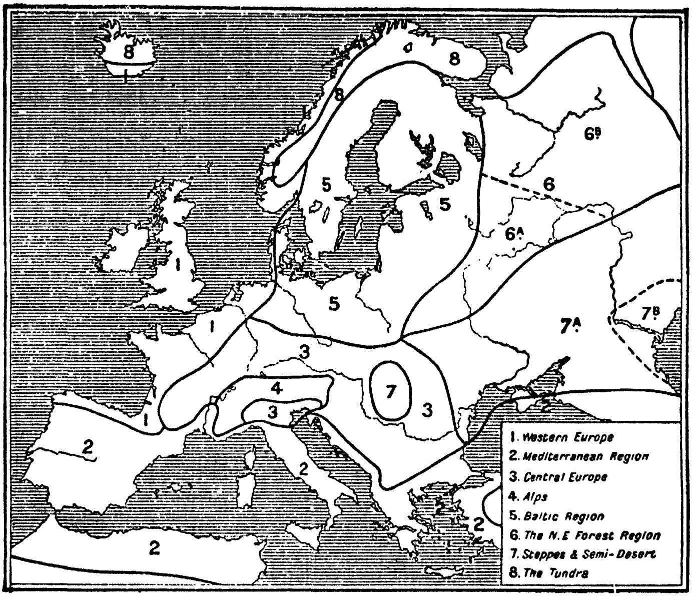


FIG. 64.—Europe: Major natural regions.

of natural meadow land. The forests have been largely cut down, and in their place, temperate cereals, fruits and root-crops are extensively cultivated. The richer pastures support large numbers of cattle, so that dairy-farming is exceedingly important in some parts of the region, while the poorer hill pastures feed numerous sheep. The discovery of rich coal and iron deposits has in many places had the effect of almost completely altering natural conditions, and has led to the concentration of large masses of people in mining areas.

(2) *The Mediterranean Region.*—We are very familiar with this type of region, with its winter rains and summer droughts, its evergreen forests and its luscious fruits. It is found on the west of continents in the transition belt between the West European regions and those of the Sahara type. Fig. 64 shows that certain lands of north Africa and western Asia are also of this type, so we must not think of it as merely including lands along the northern margins of the Mediterranean Sea.

(3) *Central Europe.*—This region occupies an intermediate position between western and eastern Europe, and all its leading characteristics are those of a transition from the oceanic conditions of the west to the continental conditions of the east. The summers are warmer than in western Europe, and the winters colder, whilst the rain, although falling at all seasons, occurs more in summer than in winter. The leading occupations resemble those of western Europe. The plain of Lombardy is included in this region on account of its distinctly continental type of climate. It is certainly not Mediterranean in type, like peninsular Italy, for most rain falls in summer.

(4) *The Alps.*—This region might have been included in Central Europe, but the fact that these mountains are not merely a barrier, but a comparatively thickly peopled barrier, so that they are an environment in themselves, is best emphasized by considering them as a definite unit. Local climate, natural vegetation and occupations vary with elevation. Pastoral occupations

are very important, and are engaged in on the higher pastures, the true "Alp," in summer, and the lower pastures in winter. Agriculture is practically confined to the valleys.

(5) *The Baltic Region.*—This region is in many climatic respects very similar to Central Europe. Like the Hudson Bay region in North America, the Baltic region is a shallow saucer-shaped depression whose lowest parts have been drowned. Both regions have been heavily glaciated, illustrated in one way by the large number of lakes around their margins; both have, or had, marginal lands densely forested with conifers; and both extensively freeze in winter, but fortunately for the Baltic its entrance is in the south and not in the frozen north as in the case of Hudson Bay. The climate of the Baltic region is moderately extreme, with rain falling chiefly in summer. The amount of the rainfall may be described as from small to moderate, and is not so much as that of the higher Central Europe region, where the summers are, on the whole, also warmer. The leading cultivations (rye, barley, oats, flax, hemp, etc.) are also of a cooler type than those of the lowlands of Central Europe (maize, wheat, hops, etc.).

(6) *The North-Eastern Forest Region.*—This is the great north-eastern forest region which lies north of the steppes and south of the tundra, and extends from the Carpathians to the Urals—and, of course, beyond the Urals into Asia. In the portion numbered 6A, the trees are largely deciduous, especially towards the south-west; in 6B they are almost entirely conifers, and in the belt along the dotted line, which roughly represents the boundary between the two types, they are mixed broad-leaved and coniferous. In the more accessible parts, *i.e.* the south-west, large areas have been cut down and the land either ploughed or used for mixed farming, but in the less accessible parts of the north-east the trapping of fur-bearing animals is still the leading occupation.

(7) *The Steppes and Semi-Desert Regions.*—Lands of this type are found in the Hungarian Plain and in

southern Russia, where they are naturally more extensive in the south-east than in the south-west, where the forests extend further south. As this region practically coincides with the natural vegetation units already described it is not necessary to say more than to emphasize that its leading characteristics are its extreme climate, its light summer rains—decreasing towards the south-east—and its consequent steppe or grassland character, with which are associated pastoral and agricultural occupations.

The area marked 7B on Fig. 64 is practically true desert.

(8) *The Tundra or Arctic Lowland Region.*—This, too, was described under the heading of Natural Vegetation. The severity of the climate is very marked. The nomadic inhabitants are few and their pursuits are restricted to Arctic fishing (in summer), to pastoral occupations (the reindeer supplies most of their necessities) and to hunting (in winter, when they migrate to the northern margins of the forests).

REGIONS IN THE HUMAN GEOGRAPHY OF EUROPE.

Professor Fleure, of the University of Wales, has classified Europe into Human Regions or Zones.[1] So helpful is this classification that we will now refer to it in outline. Europe may be divided into regions according to the response they give to human work. Thus we have—

(i) *Regions of Increment*, where, though man must put forth effort, thought and organization, even moderate effort is rewarded by an assured reward without great delay. Of such a type are the richer parts of the Mediterranean region, where from very early times the fruit-gardens and small corn-lands, without great effort, gave their cultivators, not only a rich reward or surplus, but time for leisure, which they used for the development of their intellectual and social lives.

[1] "Regions in Human Geography," *The Geographical Teacher*, Spring No. 1917.

(ii) *Regions of Effort* are regions where more work is needed to raise man above the level of poverty, and still more work to enable him to maintain what has been won. Increment or reward for labour is attained, but only after effort, so that effort is the dominant note. Thus, on the great plain of Central Europe, man has to earn his living by the sweat of his brow. He has to cut down the forests, he has to till and sow or he will not reap. Neglect brings about privation. Therefore the agricultural areas of western, central and eastern Europe are regions of effort, and so, too, are the great industrial areas, although the latter may be put in a class by themselves as special types of regions of increment.

(iii) *Regions of Difficulty* are found where even great and long-sustained effort brings little in the way of increment. They include highland regions and the colder forests of the Arctic north. A broad zone of regions of difficulty thus separates the regions of increment in the Mediterranean Basin from the regions of effort on the great Central Plain. Frequently mountainous regions of difficulty are occupied by peoples who have been driven there by stronger invaders, *e.g.* Wales. In their mountain fastnesses such people often maintain their ancient languages and customs: thus their mountains have been spoken of as "Treasure Houses of the Past," "The Homes of Lost Causes," etc. From regions of difficulty there is always the tendency to export people to the more favoured neighbouring lands. When they border the ocean, there is a steady overseas export of men, as an examination of the emigration statistics of Norway will show. It will broaden our outlook if we think of regions of difficulty as playing this important part—in some respects perhaps their most important part—in world history.

(iv) *Regions of Privation,* where human existence, even at its very best, is only possible on a very low plane. Such regions are distinctly poorer than the regions of difficulty. They support very few people, and even to those, life is one long, hard struggle, a struggle which brings little or no reward in the shape of ease, comfort or leisure. Such a region is the tundra.

THE RACES OF EUROPE.

European peoples belong to three main races. How these three races originated, and the manner in which they have developed their peculiar characteristics, does not concern us here. We must be content with a brief description of the races as we find them to-day. In the Mediterranean region (Spain, southern France, southern Italy, etc.) we find peoples of the *Mediterranean Race.* Their leading physical characteristics are heads which are long compared with their breadth; long, oval faces; short stature, and a dark complexion. A second race, the *Northern* or *Nordic Race,* spread over and established itself upon the great European Plain, and in Scandinavia. Typical representatives of this race are most commonly found in East Anglia, Scandinavia (including Denmark), and the north German plain. They are distinguished by their tall stature, fair complexion, blue or light-coloured eyes, and although "long-headed" they are less so than the Mediterranean race. Occupying the country lying between that of the two races mentioned are peoples of the *Alpine Race,* who are found in the broad belt of Highlands of Central Europe as well as over the greater part of the Russian Plain. Representatives of this race are found in Russia, Austria, Czecho-Slovakia, the Balkans, the Alps, the highlands of south Germany, the central plateau of France and in south Belgium. Their leading physical characteristic is a broad head. In stature, complexion and hair they are intermediate between the Nordic and Mediterranean races.

There is, of course, no hard and fast line between these three races and there has been much racial intermingling. Mountain countries cannot maintain all their people, they are bound to export some. Thus Alpine races from the Alps, Carpathians, Central European plateaus, have wandered into the plains, so that in the belt north of the Alps there is much admixture of Nordic and Alpine peoples. In Southern Europe there has been little mixture except in the Balkans, where, owing to the incursions of Alpine and Asiatic peoples, there is very little trace of the original race, even in Greece.

It is probable that all the races of Europe long, long ago came from Asia. There are in Eastern Europe, however, representatives of more distinctly Asiatic types. The Lapps appear to be of pure Mongol blood, but the Finns, the Magyars and the Bulgars are of mixed Mongol and European race. The comparatively few remaining European Turks are also Asiatics.

EXERCISES.

1. What are the chief reasons which lead us to believe that great Ice Sheets once spread out over north-western Europe?

2. Show how distance from or nearness to the sea affects climate (temperature and rainfall). Explain the terms: Insular Climate, Continental Climate.

3. Describe and account for, the leading features of the seasonal distribution of rainfall in Europe.

4. What changes in natural vegetation would be observed during a journey from the Arctic coast of northern Russia to the shores of the Caspian Sea? Upon what physical bases do these changes rest?

5. What is a natural region? Take any three natural regions in Europe and state their leading characteristics. Mention three regions in North America which appear to you to bear a close resemblance to the European regions you have described. Upon what physical factors do their likenesses depend?

6. From the point of view of human geography certain regions in Europe have been called regions of *privation,* others regions of *wandering,* and others regions of *difficulty.* Mention one region of each kind, and give reasons for your selection.

CHAPTER XXIX.

EASTERN EUROPE: THE OLD RUSSIAN LANDS.

Physical Features.

Eastern Europe is a vast plain stretching from the Carpathians to the Urals, from the Baltic and White Seas in the north to the Black and Caspian Seas in the south. Vastness and isolation are the keynotes to almost every important fact in connection with the great plain of Eastern Europe and its peoples.

The ancient rocks of the Scandinavian Peninsula reappear in Finland, but dip below the great sheets of undisturbed sedimentary rocks forming the Russian plain and finally appear once more in the Urals. The rivers of the plain have largely produced what irregularity of surface there is, and in wearing out their valleys have left low ridges which form the watersheds. Except in the Urals, the southern Crimea and the Caucasus, the land rarely reaches the 1,000 foot contour line. Between the Caspian and the Black Seas there is the Manytch depression, drained by a river from which it has received its name. It is less than fifteen feet above sea level.

In Finland and in northern Russia there are many signs of recent glaciation. If a curved line be drawn from the point where the Vistula leaves Poland to Archangel it will be seen that to the north-west we have a region of lakes, of complicated river systems, and, if a map showing surface drifts be consulted, of boulder clay. Now let another line be drawn from about the centre of the Carpathians through Kiev and Kasan to the Urals. Between the two lines there is another boulder clay covered region which was glaciated in more remote times. The map shows that the lakes have disappeared, but the land is not by any means drained, for some of the river lowlands are vast marshes, *e.g.* the famous Pripet marshes. South of the second line lies the famous *Black Earth Lands,* Russia's richest region. Here

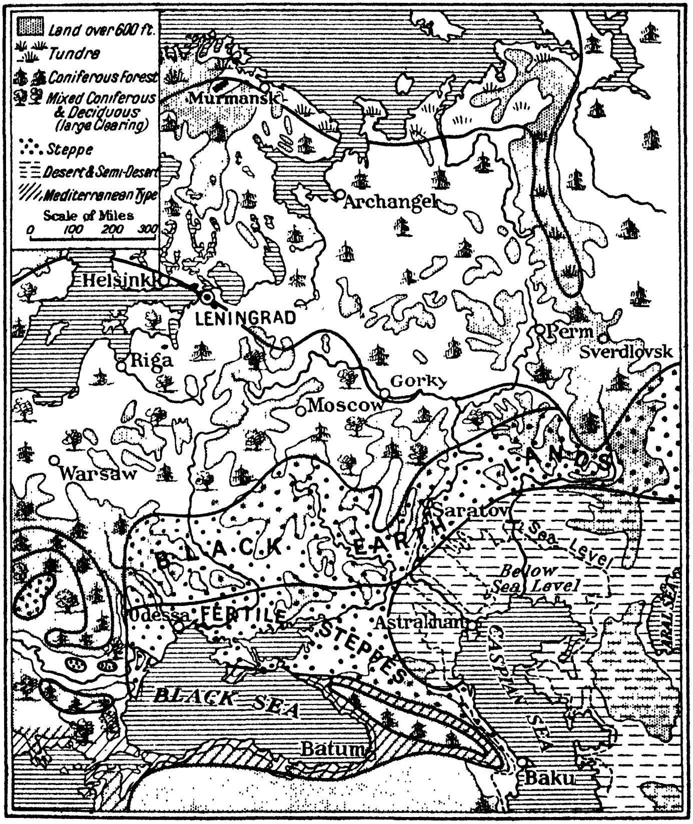


FIG. 65.—Eastern Europe.

we have exceedingly rich loess deposits enriched by the decay of the natural vegetation of ages (see Fig. 65).

In Book II we studied in North China a splendid example of wind-carried loess deposits. The Black Earth Lands of Russia give us an example of deposits largely distributed by the floods pouring from the melting fronts of the ice sheets which long ago covered the north and centre, as well as from the glaciers descending upon the plain from the Carpathians. Towards the south the Black Earth ceases along a line roughly running from the south-eastern bend of the Carpathians through Ekaterinoslav and Orenburg to the southern end of the Urals (see Fig. 65). In the south-west, although not covered with loess, the lands south of this line are fertile, but along the borders of the Caspian Sea deserts and semi-deserts prevail.

CLIMATE.

The distribution of temperature in eastern Europe shows a marked contrast with that in western Europe. The cold of the winter and the heat of the summer are very well marked. In winter only a very small part of the country—southern Crimea and Trans-Caucasia—has a temperature above freezing point, whilst over the greater part the temperature falls much below freezing point. Nor are the seasons of spring and autumn well-marked. Indeed, the first is a short season marked by the melting of the winter snows, and the second by fairly heavy rains which usually come before the winter sets in. Both turn vast areas into quagmires.

As regards the distribution of rainfall, most precipitation occurs in the west and centre (see Fig. 61), where a fall of from twenty to thirty inches is experienced. Towards the north, the south and the south-east, the amount rapidly decreases, and in places falls below ten inches, which, without irrigation, means desert conditions.

These climatic conditions exercise a great influence over the people. In the long, cold winter, outdoor work is impossible, and, except in the towns and the factories and workshops, work is practically at a standstill. Summer is the season of maximum energy, when the peasant and his family must work hard to provide the necessaries of life. At that season every little helps, so that even young children have an economic value, and most of them are required to assist in the fields. In winter, the bitter cold, the frost-bound condition of large areas, and the isolation of thousands of villages, make it very difficult to send children to school. It was because of these conditions that, up to 1927, the majority of the people could neither read nor write. To-day, special provision has been made for the education of the children, and their parents, too, have been given the chance to learn to read and to write. Since 1927 the percentage of illiterate people has fallen from 70 to 10!

WATERWAYS AND ROADS OF EASTERN EUROPE.

Keeping in mind the relief of eastern Europe, we may expect to find that most of the rivers are slow flowing and therefore help transport. But recalling the climate, we should immediately suspect that many of them will suffer from a shortage of water at certain seasons, whilst at others they will probably be in flood, both matters which seriously hamper them as means of transport. Thus, in spring, when the snow melts, and in autumn after the rains, they are swollen, if not actually in flood; in summer, owing to great evaporation, their level very considerably falls, whilst in winter they are frozen.

Those rivers which rise in the forest and flow southwards across the steppes, *e.g.* Dnieper and Volga, do not vary in level so much as those whose sources and mouths are within the steppes, *e.g.* Donetz, and are consequently of greater value.

Canals have been built in order to supplement the river systems and to give through water transport from the Baltic Sea to the Caspian and Black Seas. Three canals join the basin of the Neva to the Volga basin. The western Dwina, the Niemen and the Vistula are all connected with the Dnieper, and the new White Sea Canal gives water communication between that sea and the Baltic. A canal joining the Volga to the Don, which is being constructed where the former comes close to the latter at Stalingrad, will give the Volga basin access to the Black Sea.

Roads have been constructed in all parts of the country, but many of them are impassable during the thaws of spring, with the result that villages comparatively near to large towns are quite cut off for a time. This particularly applies to roads in the south, where road-making materials are very scarce and marsh is common. In winter, when the whole country is in the grip of frost conditions, the sledge forms a useful means of transport.

NATURAL VEGETATION.

The influence of relief and climate are very clearly shown upon natural vegetation. The tundra, roughly bounded on the south by the isohyet of 10 inches, the summer isotherm of 50° F., and the northern limit of trees, lies along the Arctic coastlands. South of the tundra comes the broad forest belt which extends to the Black Earth Lands in the south. Note the close connection between the line showing the southern limit of remote glaciation (Fig. 65), *i.e.* the line marking the southern limit of boulder clay, and the southern limit of the forests. Of course, one reason why forests give way to grasslands is the decreasing rainfall, but other factors assist too. The Black Earth soil does not retain water so readily as clay, and therefore for the growth of forests a heavier rainfall would be required on the Black Earth soil than on the clay soil. Hence the forests often terminate with the clay. South of the forests the natural vegetation is grassland in the south-west, and dry steppe, desert and semi-desert in the south-east. Vegetation of the Mediterranean type occurs in the Southern Crimea.

THE PEOPLES OF EASTERN EUROPE.

It is believed that long ago Alpine peoples inhabiting the highlands of Central Europe left their mountain homes and penetrated the great forests and swamps stretching across Russia north of the Black Earth Lands. These early peoples established their homes in clearings and developed scattered village communities, each of which was separate and self-sufficing, communal in ideals, and strongly opposed to any private ownership of land. Such a village organization came later to be known as the Mir, a name which is significant, for it means "the world."

The forest communities were organized by the ninth-century Northman, Ruric the Jute, who established an aristocratic military dynasty which lasted until the early seventeenth century. Russian conquest gradually spread from the forest until the whole of the vast territories which formed the Russian Empire in 1914 were under one central government. But geographical conditions have asserted themselves, so that the Slavs of Poland, cut off from the rest by the great Pripet and Lithuanian marshes, became a nation with different traditions, ideals and aspirations. Influenced from Rome, Poland became an eastern outpost of the west, whilst the Slavs of Russia, influenced from Byzantium, belong to the Greek Church, and are more eastern than western in outlook.

But even the true Russian peoples differ very much, and these differences are largely due to geographical conditions. There are the Little Russians, the people of the Ukraine, who live on the steppes of the south-west. These peoples have been more exposed to invasions and attacks by steppe nomads, and have been influenced by these very considerably. In the face of the nomadic incursions the White Russians took refuge in the flat, swampy, heavily forested country north of the Ukraine and east of Poland. In such a land they developed differently from the Little Russians on the one hand and the Great Russians, the "Muskovites," of the centre, north and east, on the other. Then, in the steppes of the Don, we have the Cossacks, who from 1654, when they gave their allegiance to the Russian Czar, to the Revolution in 1917, formed the great buttress of Russia towards the south-east. The Cossacks are of Asiatic stock, but linguistically they are Little Russians. Since the Revolution they have lost all their possessions and have been scattered.

Finally, we have the peoples of Finland and the Baltic countries. The Finns and the Ests, or Esths, of Estonia are of mixed Asiatic and Nordic blood, and are much alike in appearance, customs and language. The Letts of Latvia and the Lithuanians belong to the Nordic or Northern race, although they form a different branch from the Germans and Scandinavians.

It can easily be understood that Poles, Finns, Letts, Ests and Lithuanians have always longed to rule themselves, for they were never contented to remain part of the Russian Empire. That Empire has disappeared, and it is not surprising to find that Finland, Estonia, Latvia, Lithuania and Poland have gained their independence. White Russia and the Ukraine have become republics, but within the larger Union of Socialist Soviet Republics.

FINLAND.

Finland has an area of 132,550 and a population of 3¾ millions. It consists of an undulating low plateau of granitic and crystalline rocks which have been heavily glaciated, hence its innumerable lakes. These cover one-third of the surface. In the north it forms part of the tundra, but the bulk of the country is covered with forests—chiefly coniferous—in whose clearings are rich meadows noted for their dairy-farming, and fields in which rye and oats are the chief crops. The most densely peopled part of the country is, however, the small area in the south-west, where forests of the leaf-fall, *i.e.* deciduous forests, predominate. The rivers follow intricate courses, but many of them have sufficiently steep gradients to produce waterfalls which provide power for lumber, paper and pulp mills. In all these respects Finland closely resembles southern Scandinavia.

The Finns, a fine, intelligent, industrious and advanced people, are of mixed Asiatic and Nordic blood. The majority belong to the Lutheran Church. They have never ceased to assert their desire for independence, a desire which they have at last attained.

Their capital is *Helsinki* (Helsingfors; population 245,000), on the Gulf of Finland, opposite Reval. It has a splendid deep-water harbour protected by an island. *Turku* (Abo), the old capital, has an important strategic position near the Aland Islands "bridge" to Sweden. Iron ore is mined in southern Finland, and Abo is engaged in shipbuilding. The humid climate of the south-west, the abundance of water-power, and the presence of good harbours have led to the development of cotton manufacturing, which is chiefly centred in *Tampere* (Tammerfors), a town possessing all these natural advantages.

ESTONIA, LATVIA AND LITHUANIA.

These countries, like Finland, are forested lake-lands. But structurally they form part of the Great European Plain, and they have resemblances to the adjoining plain of north Germany, particularly as regards their poor glacial soil, and the crops grown in the extensive forest clearings. These are chiefly hemp, flax, beet, rye and potatoes. As in Germany, these products are made the basis of industries, *e.g.* sugar from the beet, alcohol and starch from potatoes and linen manufacturing from the flax. In the forests the timber is cut and floated down the rivers to the ports, *e.g.* Riga, at the mouth of the Western Dwina. Minerals are almost entirely lacking, so that manufactures, except those mentioned above, are not common.

A glance at the map will show the importance of the position of these three countries, for they lie between Central Russia and the Baltic Sea. Before the Great War their ports (Riga, Reval, etc.) were very important exporters and importers for Russia, but they have declined in trade and importance owing to the unsettled condition of Russia. Here are a few particulars of each of these new countries:

Estonia (area 18,400 square miles; population 1.1 millions). This country lies south of the Gulf of Finland. Its capital is *Tallinn* (Reval), an important port.

Latvia (area 25,000 square miles; population 1.9 millions). This land lies south of Estonia and includes the coastlands of the Gulf of Riga. The majority of the people (74%) are Letts. *Riga* is the capital. This city is a very important port, and besides its extensive trade in all kinds of Baltic produce, it has important manufacturing industries, especially of linen and cotton goods.

Lithuania (area 31,600 square miles, approx.; population 2.3 millions). This new country lies south of Latvia and is chiefly made up of the former Russian governments of Vilna, Kovno and Suvalki. Like its northern neighbours (Estonia and Latvia) it is a typical Baltic lowland. *Kovno,* a city of 113,000 inhabitants, is the capital, and Klaipeda (Memel) the chief port.

POLAND.

This restored country, largely the basin of the Vistula, has an area of 150,000 square miles and a population of 32 millions. It occupies a very important position as a "buffer state" between Russia and Germany, but the absence of good natural boundaries on the east and west will be a source of weakness in the future as it has been in the past. It comprises Russian Poland, the German provinces of West Prussia and Posen, and parts of Galicia and Upper Silesia.

Three different regions are found in Poland:

(1) The narrow southern region formed by the forested ridges of the Carpathians.

(2) The plateau lands of the south, including the Carpathian foreland. This part of the country is still extensively forested, but agriculture is followed in the river valleys, whilst it is in this region that the mineral wealth of this new country is very largely found. Coal, iron, salt and petroleum are all important products.

(3) The central plains and the Polish "Corridor." The

central plains are the principal agricultural and manufacturing part of the country, while the " Corridor " is a strip of territory of great importance to Poland. Both form part of the Baltic region of Central Europe.

Poland contains within its borders valuable forests, extensive agricultural lands and rich mineral deposits (including coal, iron, oil and salt). It has, therefore, every opportunity of developing into a strong State, if the Poles prove equal to the task. *Warsaw* occupies a splendid position for its function of administrative centre. It stands on high ground between the Baltic heights and the Carpathians, at an easy crossing-place of the Vistula, and is thus unaffected by floods. Its importance as a controlling point of east and west routes, and as the great western land gate to Russia, is seen in its predominance as the distributor to Russia of the goods and products of Western Europe. Its best outlet to the sea is by way of the Polish " Corridor " to Danzig and Gdynia. For a time the old kingdom of Poland included this outlet within its frontiers, but although Poland has once more gained access to the sea (see Fig. 66), Danzig, and the territory around it, has become the " Free City of Danzig " under the protection of the League of Nations. Nevertheless, Poland has freedom of access through the port, whose railways, docks and trade she also controls. The Poles have also their own port of Gdynia, which they have built a few miles west of Danzig. Gdynia has already become one of the chief ports of the Baltic.

Lodz, noted for its cotton manufacturing, lies south-west of Warsaw. The raw cotton is imported via the Vistula. Both Lodz and Warsaw have important iron and machinery, leather and textile industries, while the mining and metal industries of the Upper Silesian coalfield are of great value and future potentiality. Cracow and Lwow (Lemberg) are the chief Galician cities. *Cracow,* an old Polish capital, stands on the Vistula, where it passes through a gap between the Carpathians and the Polish Heights, so that it commands a great route along the Carpathian foothills. It is also not far from the important Moravian

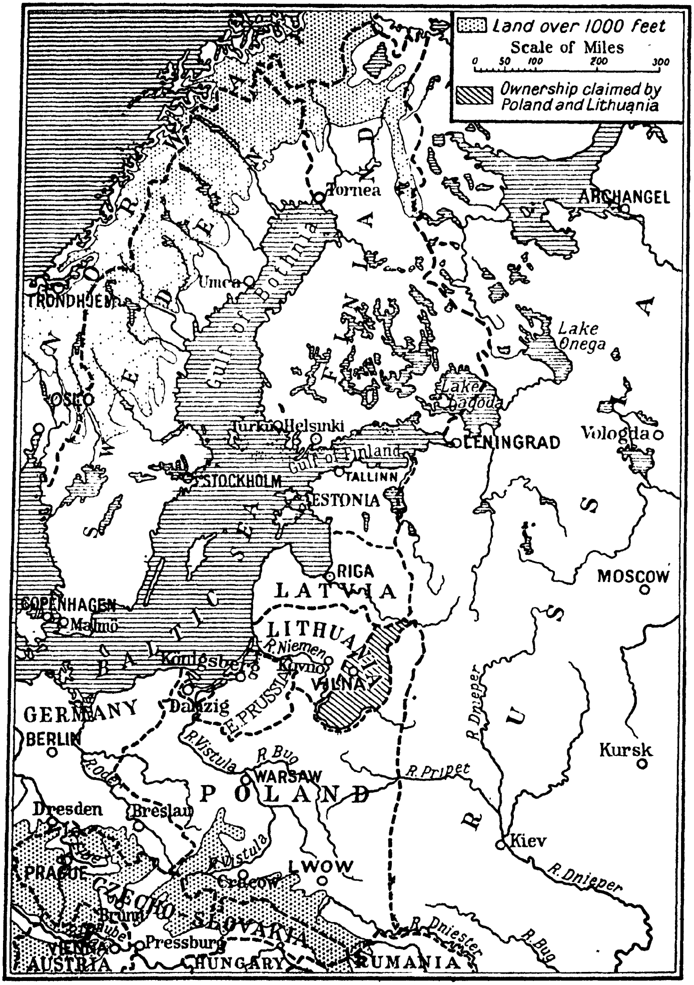


Fig. 66.—Poland and the New Baltic States.

Gate. Near Cracow there are rich deposits of salt and petroleum. *Lwow* (Lemberg) stands on the watershed between Baltic and Black Sea streams, and commands important routes leading to Kiev and Odessa.

THE UNION OF SOVIET SOCIALIST REPUBLICS.

This union was formed in 1922 by the federation of the following Soviet republics:—

(1) The Ukraine.
(2) White Russia.
(3) The Russian Socialist Federal Soviet Republic (R.S.F.S.R.).
(4) The Trans-Caucasian Federation.

The last named is a confederation of the republics of Armenia, Georgia and Azerbaijan. Being in Asia, the Confederation will be omitted from the present survey.

THE UKRAINE.

The word Ukraine means borderland, a very suitable name at the time it was given, for the country lies on the southern edge of the early Russian state which grew up in the forests. The new republic has an area of about 175,000 square miles and a population estimated at 32 millions. It reaches the sea between the mouths of the Dneister and the Dnieper and also for about 50 miles along the Sea of Azov. The greater part of the country lies in the steppe region, so that agriculture and pastoral occupations are the dominating natural occupations.

The Ukraine is the greatest agricultural region of Eastern Europe, and excepting the Moscow and Polish industrial areas, the most densely peopled. The reasons for this are a suitable climate and a fertile, easily worked soil. In the Black Earth Lands (see Fig. 65) both are ideal for wheat, formerly the most valuable crop. Before the Great War Britain and other Western European countries imported large quantities of Ukrainian wheat. This was largely produced on the estates of the great nobles. Now that the land has been parcelled out among the peasants and most of it has been organised into collective farms each containing 200 or more families, less wheat is grown and more attention is paid to crops for home consumption. Wheat, rye, oats, barley and maize are the chief products. Flax, hemp, beet and tobacco are also grown, the first three particularly in the west. Although large quantities of these crops are produced, the yield, compared with the area of land ploughed, is comparatively small.

The cultivated area extends southwards beyond the margins of the Black Earth region to the fertile steppes; but towards the east and along the margins of the Black Sea the land becomes sandy and less fertile, and the rearing of horses, cattle and sheep predominates.

The Ukraine contains the western part of the chief Russian coalfield. This lies in the valley of the Donetz, a tributary of the Don, and covers a larger area than all the British coalfields put together. All kinds of coal—anthracite, bituminous and lignite—are found, as well as an abundance of manganese, used in making steel. A large proportion of the iron produced in Russia is also mined on this coalfield, and most of it is worked into iron and steel on the spot. Much coal is exported, especially by direct rail to Moscow and Leningrad, and iron and steel trades are very important in towns between *Kharkov* and the Sea of Azov.

Odessa is the great outlet for most of the products of the Black Earth Lands. It stands on the Black Sea near the mouth of the Dniester. If it were at the mouth it would be more troubled than it is with winter freezing. As it is, although so far south, its harbour is often inaccessible for a short time during the winter. *Nikolaiev,* on the Bug, and *Kherson,* on the Dnieper, are also important ports. All three are engaged in flour-milling and in shipbuilding.

Kiev is the Ukrainian capital. Built partly at the river level and partly on high ground overlooking the Dnieper, it controls the routes along the Pripet and the Desna. It is a very ancient city, and was once the capital of old Russia; but its position, at the southern edge of the forest, exposed it to the attacks of Mongol invaders, so that the capital was transferred to Moscow, which lies within the forest. Kiev has important industries, including flour-milling, sugar-refining (beet), and tobacco and woollen manufacturing. *Kharkov,* situated near the eastern frontier in the upper valley of the Donetz, is the chief industrial centre. A great new industrial town is springing up at *Dnieprostroi,* where the Dnieper rapids occur. A gigantic dam has improved the navigation of the river and has been the means of supplying water power to the largest electric power station in Europe.

WHITE RUSSIA.

The independence of this Socialist Soviet Republic was proclaimed in 1919. It has an area of nearly 48,750 square miles and a population of over 5 millions. We have already noted the geographical factors which have helped to create a separate political unit in the land of the White Russians. White Russia is a land containing vast marshes, swamps and extensive deciduous forests. It lies north of the Ukraine, east of Poland, and south of Estonia, Latvia and Lithuania.

On the whole, this land is not very fertile; the population is sparse and scattered, and there are few large towns. Agricultural and pastoral occupations form the principal means of livelihood, and wheat and barley are less important than rye and oats. Flax and hemp are also grown and exported.

Minsk, the capital, lies north of the famous Pripet marshes, on the main railway line from Warsaw to Moscow.

THE RUSSIAN SOCIALIST FEDERAL SOVIET REPUBLIC (R.S.F.S.R.).

This title is given to practically all of what remains of the old Russian Empire after Finland, the new Baltic States, Poland, the Ukraine and White Russia have been taken out. It includes the Asiatic as well as European territory, but at present we shall devote our attention to the European part only. The details of the Constitution of this new Federal Republic are most interesting. They may be found in a book of reference such as the *Statesman's Year Book.*

The Republic has a population of 111 millions, and includes the following natural regions:

(1) *The Tundra.*—This region roughly lies north of the 65th parallel. It is a region of privation whose extreme climate and little rainfall prohibit the growth of forms of vegetation higher than lowly mosses, lichens and berry-bearing shrubs. Its few inhabitants are engaged in fishing, hunting, and in breeding the semi-domesticated reindeer. In the lower basin of the Dwina, which includes both tundra and forest, the inhabitants are engaged in preparing oils (from the products of Arctic fisheries); tar, pitch and timber (from the forests); and in trading in furs, skins and tallow. The centre of this trade is *Archangel,* the oldest, and once the only, Russian port. Unfortunately it is only ice free for about one hundred and seventy days each year, so that its sea-borne trade is concentrated upon the summer months.

(2) *The Forest Zone.*—This region lies south of the tundra and stretches across the country from the Urals to the Baltic Sea, although the length of coastline on that sea is now restricted to a part of the shore lines of the Gulf of Finland. In these northern forests the severity of the climate, the remoteness of large areas from the sea, and the lack of adequate means of communications have all conspired to retard development, except towards the south and the south-west, where extensive areas have been cleared of trees, and agricultural and other occupations are followed. The north-eastern portion of this region is still in a state of virgin forest, where trapping and hunting are the chief occupations, but where lumbering and forestry trades (extraction of tar, pitch, resin, etc., pulping and paper-making) will increase in importance as the region is developed.

Cultivated areas now extend as far north as the southern margin of the White Sea, but they are chiefly found in clearings in the south-western forests south of the 60th parallel of latitude. Rye, oats and root-crops are the chief cultivations.

Two coalfields are situated in this region. The first, which lies south and south-west of Moscow, was the earliest Russian coalfield to be developed. Unfortunately the coal is of inferior quality, so that the industries which have grown up have to obtain much of their supplies from the Donetz coalfield, to which a railway has been built for the purpose. *Moscow,* the largest city of Russia and once more the capital, has important cotton, wool, leather and china industries, and is also the chief engineering centre in the country. The city, which is typically Russian and lies *within* the forest but towards its southern margin, grew up around a fortress—the nucleus of the famous Kremlin—built on a hill overlooking the Moskva, a tributary of the Oka. Owing to its central site it has become the great hub of the Russian railway system, whilst

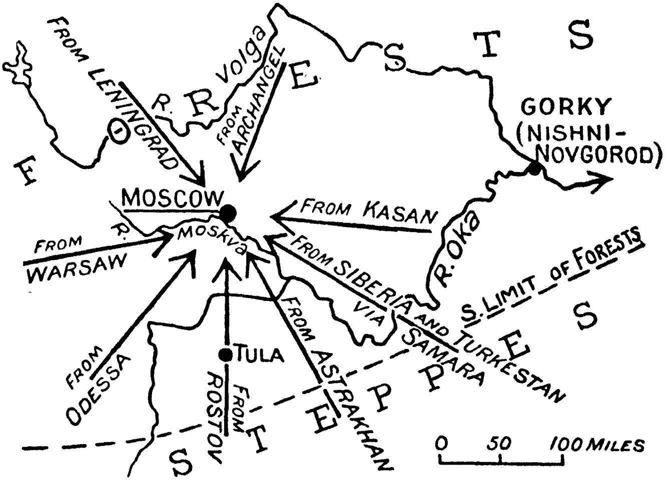


FIG. 67.—The Position of Moscow.

its position with regard to the Volga has made it a great centre for water routes (see Fig. 67). *Tula,* which lies south of Moscow, has large iron and steel works, and engages in the making of munitions and war materials.

The second coalfield lies on both sides of the Urals, in the district containing *Perm* and *Sverdlovsk* (formerly Ekaterinburg), the chief centres. The district is also noted for its minerals, particularly iron—the most important—gold, copper, platinum and precious stones. Perm, Sverdlovsk and other towns have growing iron and steel trades, and in normal times produce large quantities of railway stock, ordnance, agricultural implements, etc.

Two other inland towns deserve special mention. *Gorky* (formerly Nishni-Novgorod), a city situated at the junction of the Oka and the Volga, is the old meeting-place of east and west. Before the building of railways much of the trade of Russia was transacted in great annual fairs held at convenient centres. To these fairs came merchants from far and near, with the result that they had an international character. Since the Revolution the fair has been abolished, and the city is now noted for its huge motor-car factory. *Kazan* stands on rising ground a little distance from the Volga, so as to be above the flood limit. But equally important is the fact that it stands in the steppe at the southern margin of the forests. This is because it was founded by Mongols, who, centuries ago, poured in great hordes from the Asiatic nomad-lands into the steppes of Russia. Kazan was one of their capitals, and its site was selected on account of its suitability for keeping the Russians of the forests in check.

We have seen that the forest belt reaches the Baltic Sea on the west. There, at the head of the Gulf of Finland, stands the important city and port of Leningrad. The Baltic countries of Estonia, Latvia and Lithuania once formed part of a Swedish Baltic Empire, but they were conquered by Russia, and Petrograd, now re-named *Leningrad,* was established by Peter the Great in 1703 near the site of the Swedish fortress of Landskrona in order to assure the conquests. He intended that it should bring

Russia into closer contact with Western Europe. Leningrad is built at the mouth of the Neva at the head of the Gulf of Finland. It stands on both banks as well as on two large deltaic islands (see Fig. 68). On the seaward side the city is protected by the fortress of Kronstadt, built on an island at the entrance to the narrow upper end of the Gulf of Finland. Leningrad is now the only " eye " through which Russia can look out on the Baltic Sea. It is not now the capital, and it has lost much of the prestige and importance which it possessed before the Great War. It appears destined, however, to become a greater port than formerly and also a great industrial centre. It has factories and workshops for the manufacture of boots and shoes, power plant machinery, railway rolling stock, rubber goods, etc. One of the latest Russian railways connects Leningrad with *Murmansk,* a practically ice-free port in the north of the Kola peninsula. Even so far round North Cape the effect of the warm North Atlantic Drift is felt.

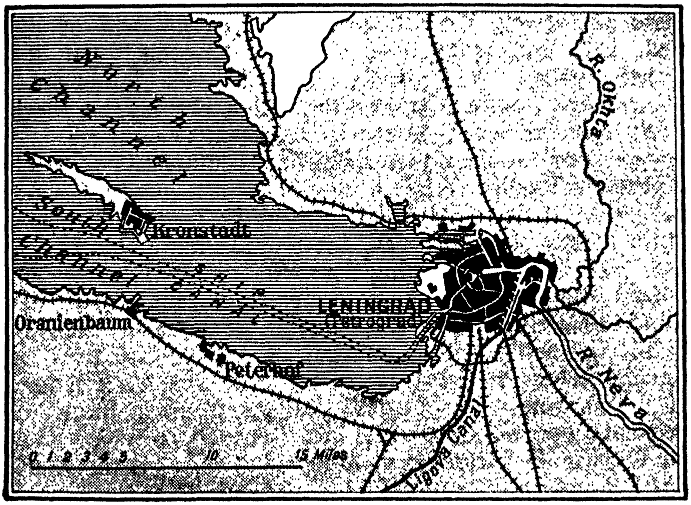


FIG. 68.—The Site of Leningrad.

Leningrad will also gain from the new canal connecting the Baltic and White Seas.

(3) *The Black Earth and Fertile Steppes Zone.*—The Black Earth Lands stretch from the Ukraine to the Middle Volga (see Fig. 65). Large areas of grassland have been taken over for the cultivation of crops, especially wheat, barley and maize. Animals of all kinds are also kept, and there are numerous poultry farms. This region supports a fairly dense agricultural population, and there are several large towns. The development of the coal, iron and manganese resources, especially of the Donetz valley, has greatly increased its importance. *Saratov* and *Samara,* both on the Volga, are eastern Black Earth Land centres. Both are important river ports, and tobacco and woollen manufacturing centres. *Stalingrad* (formerly Tsaritsin) has a new huge works which turns out 50,000 tractors annually. *Rostov* is the principal port in the south. It stands near the mouth of the Don and is noted for its new agricultural machinery factories.

(4) *The Salt Steppes and Deserts.*—This region lies along the border of the Caspian Sea. It owes its sterility to the deficiency of the rainfall. A large part of it is actually below the level of the sea and once formed part of the shrinking salt Caspian. In these areas there are extensive salt marshes. The rest is usually sandy. Near the Caspian Sea true desert occurs, but towards the Black Earth Lands there are sufficient patches of grass to support nomadic pastoral tribes like the Kalmucks of the lower Volga, and the Kirghiz of the Ural river. This is one of the very few parts of Europe where camels are used for transport. They are frequently seen in the streets of *Orenburg,* on the Ural river, to which town animals, wool, skins and leather are taken for sale or exchange. At Orenburg the great rail and caravan routes from Turkestan enter Russia. The most important town in the region is *Astrakhan* at the mouth of the Volga. It engages in the Volga and Caspian sturgeon fishing, and in the preparation of isinglass and caviare. It is, of course, hampered by the fact that the Caspian Sea has

no outlet to the open sea, and also by the freezing of its harbour for about three months every year. It has also an extensive trade in wool and tallow, and distributes by rail to different parts of Russia the petroleum brought by steamer from Baku, and the cotton brought by rail from Turkestan and central Asia to Krasnovodsk, and from thence by steamer across the Caspian Sea.

(5) *The Mediterranean Lands.*—Russia has no territory on the Mediterranean. The lands included under this heading are, of course, those which have the Mediterranean type of climate. The flat northern part of the Crimean belongs to the steppe, but the south comes within the region of winter rains and summer drought. It is crossed by mountains which form a link between the Balkans and the Caucasus. The southern slopes to the Black Sea, often called the Crimean Riviera, produce vines and other Mediterranean products. *Sevastopol,* at the western end of the mountains, is the Russian Black Sea naval depôt.

CHANGING RUSSIA.

Great changes are taking place in Russia to-day. The huge tractor works at Stalingrad and the vast works at Rostov where combines and other agricultural machinery are made are indicative of new methods of agriculture. Seventy-five per cent. of all the cultivated land has been organised into collective farms in which 200 or more families combine in order to increase efficiency and production. Each collective farm is given its programme of production which it must carry out. The collective farms hire tractors and other machinery from the nearest Government tractor station. There are also a number of giant State farms and numerous farms run by individual families, although these are gradually being collectivised.

Astonishing progress is also being made in the industrial side in the belief that the industrialisation of the country will bring a higher standard of life to the workers. The new factories in Moscow, Leningrad, Gorky, and Rostov; the power station at Dnieprostrai; the new White Sea

Canal; the underground railway at Moscow; and the new Turk-Sib. railway in Siberia, are only examples of what has already been achieved.

All this will necessarily affect the rest of Europe, for Russia now enters the field of competition with the nations of Western and Central Europe. The whole of her people have been mobilized and organized so as to give the most effective help to ensure success.

It is difficult to find out exactly what *is* happening in Russia, but her experiments in government and in industry, following upon centuries of autocratic rule by the former Tsars, are being watched with interest by other countries. We may not agree with the harsh treatment meted out to the Russian Churches or to those who supported the former Government of Russia, and we may have no sympathy with her present rulers, but two things we should never forget: (i) that the mass of the people of Russia are just as kindly and warm-hearted, as frugal, as patient, and as hard-working as they were before the changes took place; (ii) that Russia is not Western Europe, is more " eastern " in outlook and tradition than " western," and that, being good geographers, we shall not expect things to be done just in *our way*.

EXERCISES.

1. Draw an outline map of Eastern Europe on as large a scale as possible. Then mark the following in such a way as to prevent clashing of colour or line-shading schemes: Land over 1,000 feet, rivers, a few carefully selected January and July isotherms, the parts having over 20 inches of rain per annum, the types of natural vegetation, the black earth lands, the distribution of the chief peoples (print names boldly over areas concerned), the chief coalfields. How does the bringing together of all these factors help the division of Russia into natural regions?
2. Examine the sites of the following cities with special reference to their command of routes: Minsk, Kiev, Orenburg, Kasan. Draw sketch maps, on which boldly indicate the points mentioned in your answer (see Fig. 67).
3. Give geographical reasons why Poland and White Russia, although both inhabited by Slavonic peoples, have grown up apart.
4. Examine the geographical factors which make for (*a*) the stability, (*b*) the instability of the new Baltic countries and Poland.

CHAPTER XXX.

THE SCANDINAVIAN PENINSULA.

THE Scandinavian Peninsula contains two countries, Norway and Sweden. From 1814 to 1905 both were under one political control, but it will be seen from our study of the geography of the land that the peninsula contains two environments with different geographical conditions. These differences have asserted themselves in the realm of political geography.

PHYSICAL FEATURES.

The Scandinavian Peninsula consists in the main of an ancient plateau whose rocks resemble those of the Scottish Highlands and Grampians. This plateau is so tilted that throughout its length, from the Naze in the south to North Cape in the north, it descends very rapidly to the Atlantic Ocean, whilst to the east it descends to the Baltic in a series of plateau steps. The highest crest is, therefore, close to the west coast and is known by various names. In the north it is called the Kiolen Mountains, since from the sea its long, even crest reminded the fishermen of the keel of an upturned boat. In the south, where the plateau is highest and most extensive, there are many "fields" or "fjelds," mountain ridges rising above the general level of the plateau, of which the Dovre Field and the Hardanger Field are the chief. Notice also the Jostedals Brae, an extensive permanent snow-field (see Fig. 69). Only in the south of Sweden, in Scania, are young rocks found, and these are largely covered by sheets of glacial materials which also cover parts of the coastal lowlands, as well as the depression extending from

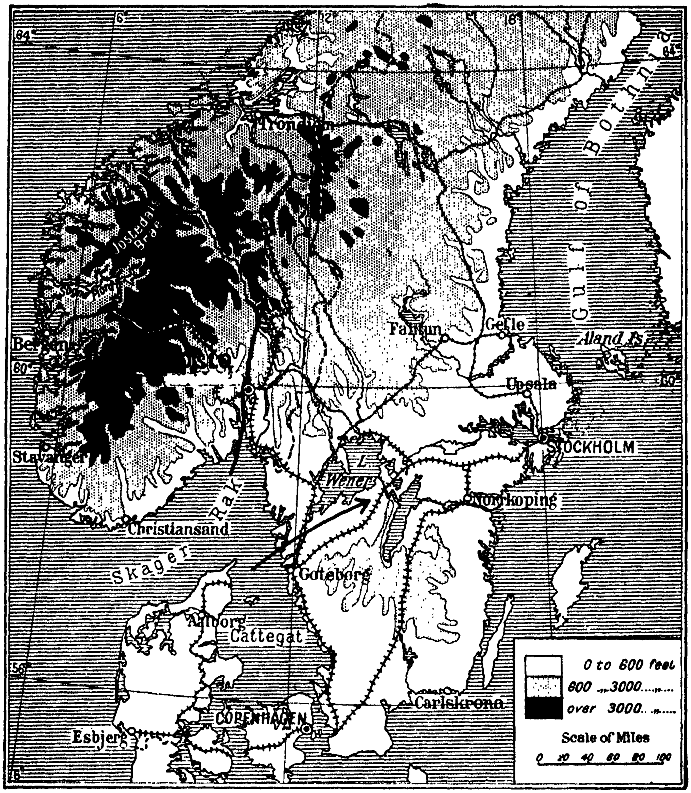


FIG. 69.—Southern Scandinavia.

Göteborg to Stockholm, a depression which was once a strait.

The Scandinavian coast-line presents features of great interest. In Norway the coast is extraordinarily bold, rugged and deeply indented. Its characteristic features are the fiords and the " skerry-guard " or " fence " of islands. The *fiords* are former river valleys, scooped out and deepened by glaciation, and sunken so as to admit the sea. Glaciation is an essential characteristic of a fiord, and the name " ria " should be reserved for sunken river valleys which have not been glaciated, *e.g.* Plymouth and Falmouth Sounds in south-western England. At the entrance to a fiord a submarine sill, or morainic heap, marks the place where the glacier, which once occupied the fiord, melted. The fiord itself is narrow and steep-sided, frequently its sides rise precipitously from the water to a height of a mile. At the head of the fiord there is a small lowland, worn by the glacier. This lowland is of importance as a small agricultural land amid mountains. Sogne, Hardanger and Trondhjem fiords are the best known. The first named extends inland for a distance exceeding 100 miles and attains a depth of 4,000 feet. The *Skjaergaard,* or *skerry guard,* of islands lies quite close to the coast, and consists of smaller islands in the south than in the north, where the Lofoten Islands attain a considerable size. This island wall is of great economic value on account of the protection which it affords from Atlantic waves and storms. The waters between the islands and the coast and within the fiords are very calm. They were the nursery and training grounds of the Vikings of old, and in modern times of the sailors and fishermen for whom Norway is noted. The word Viking means "a frequenter of viks" (bays and fiords), or, rendered freely, "the man of the calm water." The coast of Sweden, too, is usually rugged, and it has its island fringe. But both the coasts and the islands are low, and generally sufficiently fertile to be wooded, whilst those of Norway are high and barren and almost force man to find his means of livelihood on the sea

CLIMATE.

Norway is largely a Western European type of region; Sweden almost entirely belongs to the Baltic region The extreme north and the snow-fields of Norway belong to the tundra. Neglecting for the moment the tundra, for it supports so few people as to be relatively unimportant, the essential characteristics of the climates of Norway and Sweden are illustrated by the following figures—

Towns.	Mean January Temperature.	Mean July Temperature.	Mean Annual Rainfall in inches.
Bergen	34° F.	58° F.	68
Stockholm	27	62	16
Tromsö	27° F.	52° F.	41
Lulea	13	59	19

These figures indicate that Norway has a more equable distribution of temperature than Sweden, where a more extreme type of climate is experienced. The rainfall of Norway is also greater than that of Sweden, which lies in the *rain shadow* of the higher Norway. In both countries temperature falls with increase in latitude, but to a more marked degree in Sweden during winter-time. In Norway the coast is ice-free even to the extreme north, but in Sweden the Gulf of Bothnia freezes every winter, sometimes from side to side so that it can be crossed by sledges, whilst the Sound and the other Baltic entrances are sometimes closed owing to their being blocked by drifting masses of ice, but they are only very rarely themselves frozen. Most of the Swedish rivers and canals are frozen for various periods in winter.

SCANDINAVIAN RIVERS.

The rivers of Sweden are of much more value than those of Norway, but even in Sweden they usually flow too fast to be of value for navigation. The Norwegian rivers are short, owing to the nearness of the watershed to the sea, exceedingly swift, and frequently reach the sea by a great leap from the towering heights overlooking the fiords. Fortunately, however, Norway has the Glommen, without whose valley she would indeed be a poor country. The longer Swedish rivers are of great value for their flotability, and they are employed in transporting timber from the forests to the coasts. The accumulated winter snows on the lower valleys, and the lower courses of the frozen rivers themselves, thaw before the snows and ice of the highlands near the sources. This gives the rivers two floods, and enables most Swedish timber to reach the sawmills or the ports in the same year in which it is cut down, an advantage not possessed by other Baltic lumbering lands, *e.g.* Finland. In both countries the rivers are of great value as sources of power.

CHIEF OCCUPATIONS.

The physical and climatic contrasts between the two Scandinavian countries result in marked differences between their leading occupations.

Fishing.—It is obvious that Norway is the more important country in this respect, not only on account of its coastline, but also because it is in contact with the open sea, and particularly with the great fishing grounds of the continental shelf and the Arctic fishing of northern seas. Sweden opens to an inland sea, which has the disadvantages of being very brackish and cold. The Norwegian fishing centres are Bergen and the Lofoten Islands. Salmon are caught in the fiords and rivers.

Shipping and Shipbuilding.—Since these are closely related to fishing and contact with the sea, it follows that Norway leads in this respect too. She is, indeed, one of the leading shipowning countries in the world, and is particularly well favoured for the building of wooden ships. So is Sweden, whose wooden ships engage in Baltic trade. The Baltic type of shipping is in many respects unlike that of the Mediterranean, and in particular there is a difference in the kind of ships, for the Mediterranean is a great highway to the East, and is used by much larger vessels than the majority of those navigating the enclosed Baltic.

Forestry Occupations.—Here Sweden leads, for she has much more extensive and more valuable forests than her neighbour, whose land is more barren owing to its elevation. Except for the northern tundra and its extension southwards along the high plateau, the whole peninsula lies within the belt of cool temperate forests. In the south deciduous and mixed deciduous and coniferous forests prevail, but elsewhere the forests are of pine, fir, larch and spruce. Over one-fifth of Norway is forested, and over one-half of Sweden, a fact which is reflected in the exports, for Sweden exports between three and four times as much timber and wooden goods as Norway. Scandinavian timber is particularly good and hard, because, the growing season being short, the annual rings are close together.

Closely allied to the lumbering trade are such industries as match-making and the making of wood-pulp and paper. These industries flourish in many places, electrical power being supplied by the numerous waterfalls. The modern tendency is not to export "raw" timber and wood-pulp, but to make the timber up into furniture, door- and window-frames, etc., and to convert the pulp into paper, before exportation.

Agriculture.—Sweden has great advantages over Norway in respect of agriculture. In Sweden 9 per cent. of the land is cultivated, and in Norway, where 72 per cent. is waste land, only 3.6 per cent. As should be expected, the cultivated areas of Sweden are largely in Scania, and in Norway in the Glommen valley. The chief cultivations are oats—easily the chief—barley, rye and root-crops, particularly potatoes. Pastoral occupations are important in both countries. In southern Sweden dairy-farming is the leading industry, and considerable quantities of butter and other dairy products are exported. Norway, having poorer hill pastures, has twice as many sheep and goats as Sweden.

Mining.—Scandinavia is exceedingly rich in minerals, especially in iron ore, and in this respect Sweden leads. She is one of the world's chief producers of high-grade iron ore. The chief mining centres are *Dannemora,* north of Stockholm, and *Gellivara* and *Kiruna* (see Ex. 7 on page 318) in Norrland. This Arctic field, which produces over three-fifths of the total, has the disadvantage of having as its Swedish outlet a port, Lulea, which is ice-bound for the whole of the winter. Therefore a railway, operated by power from the Porjus Falls, which is also used for smelting, has been built to the ice-free Norwegian port *Narvik,* on Ofoten Fiord. Most of the iron ore is exported, especially to Great Britain and Germany. Copper (mined at Fahlun, though in less quantities than formerly), silver, zinc and sulphur pyrites (valuable in paper manufacturing) are also mined.

The mineral wealth of Norway is also considerable, and is being developed. All the ores of Sweden are found, but the iron is of lower grade. Copper is very important at *Röros,* near the source of the Glommen.

Manufacturing.—With the development of their water-power, both countries have increased their manufactures. The leading industries are connected with the timber and wood-pulp trades. Norway, with an ice-free ocean, fine harbours and a suitable climate, may become a cotton manufacturing country. Already the famous hydro-electric power-station at Rjukan manufactures nitrates for fertilizing the world's farms from the nitrogen of the air, and Sweden has developed her iron and steel trades, especially such highly skilled trades as the making of telephones, wireless equipment, and scientific and electrical appliances. Engineering, woollen and cotton trades are carried on at Norrköping, and cotton manufacturing at Göteborg.

In both countries the application of electricity to problems of transport has received great attention; while Sweden exports electricity to Denmark.

POPULATION, CHIEF CITIES AND ROUTES.

Although the area of Norway (125,000 square miles) is a little larger than that of the British Isles, the total population is only about 2.8 millions. Sweden, with a still larger area (173,000 square miles), has a population of 6.1 millions. In Norway two-thirds of the people live on the sea-coast and one-quarter in the valley of the Glommen, so that only one-twelfth are found in the rest of the country.

Some of the most important Scandinavian cities lie at the seaward ends of two great depressions, one crossing Norway, the other Sweden. The Norwegian north and south depression is marked by the valleys of the Glommen and another smaller river. It offers the easiest line of movement from Christiania Fiord to Trondhjem Fiord, and is controlled at its southern end by Oslo, and at its northern end by Trondhjem. *Oslo*[1] (population 258,000), the capital of Norway, stands at the head of the pine-clad fiord of the same name. It is the only large city in the country, its next rival in point of size, Bergen, having 98,000, and Trondhjem, the third city, 55,000. It is at the southern gate to the richest and most fertile part of the country, viz. the Glommen valley, and is an important railway centre for routes to Bergen, Trondhjem, Stockholm and Göteborg (see Fig. 69). *Trondhjem,* the ancient ecclesiastical capital of Norway, is an important fishing and tourist centre. *Bergen* is closely related to Oslo and Trondhjem, for it was selected by the Hansa merchants as a half-way house on the sea-route between the two. It lies on the coast, about half-way between the great Sogne and Hardanger Fiords, and is protected by the skerry-guard of islands. It is the chief Norwegian fishing centre, and exports large quantities of fish to the Roman Catholic countries of Southern Europe.

The Swedish depression runs east and west, from the

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[1] From 1624 to 1924 the city was named Christiania, but on January 1st, 1925, Oslo, the name by which the city was known from 1047 to 1624, once more became the name of the capital.

Skager Rack to the Baltic, and has on its seaward margins Göteborg and Stockholm. Part of its floor is covered by lakes, of which the largest are Wener, Wetter and Mälar. Water communication between the two towns is maintained by the Gota Canal, which connects Göteborg to Lake Wener, that lake to Lake Wetter, and the latter to the sea via Norrköping. The rest of the passage is by sea. *Stockholm* (514,000 inhabitants), at the eastern gate of the depression, is built at the entrance to Lake Mälar. It is a beautiful city of pine-woods, islands, bridges and lakes. It rose to great importance in the middle ages, when Sweden possessed Finland and part of the south coast of the Baltic, for it is centrally placed on a sea which in those days had a greater relative importance than it has to-day. It is becoming a manufacturing town, owing to the development of the mineral resources of neighbouring districts. It has rail connections with Malmö, Göteborg, Oslo, Trondhjem, and Lulea (note that a railway runs right round the margin of the Gulf of Bothnia to Helsingfors and Leningrad). *Göteborg,* at the western gate of the depression, is a very important outlet for forest products and dairy produce. Its population is about half that of Stockholm. Stockholm, Göteborg and Malmö are the only towns in Sweden with populations exceeding 100,000.

Other Norwegian towns are *Stavanger,* a shipping centre south of Bergen, and *Tromsö* and *Hammerfest,* both northern fishing centres. In Sweden, *Malmö,* a very important port and packet-station standing on the Sound opposite Copenhagen, and *Carlscröna,* the naval station, should be carefully noted.

EXERCISES.

1. Explain clearly the leading geographical features of Scandinavia in such a way as to bring out the influence of geography upon the division of the peninsula into two political units.

2. Draw an outline map of the coasts of the North Atlantic Ocean. Mark on it: (i) the January isotherm of 32° F. and the July isotherm 60° F.; (ii) the chief ocean currents; (iii) the prevailing winds. Write a short description of the map, with special reference: (*a*) to the climatic differences between Norway and

Sweden; (*b*) to the ice-free Norwegian ports and the winter ice-bound Swedish ports.

3. Why is it that: (i) Tromsö is ice-free, whilst Lulea on the Gulf of Bothnia, although further south, is ice-bound in winter? (ii) At North Cape the sun never sets between May 12 and July 29? (iii) The water in the Baltic Sea is below the normal in salinity?

4. Write a letter describing an imaginary holiday spent about midsummer along the Norwegian coast. Be careful to describe the fiords, the "skerry-guard" and the midnight sun.

5. Find out all you can about the use of hydro-electric power in Norway. Why is Norway fortunately situated in respect of this source of power? Do you think it will be possible to establish cotton spinning and weaving on a large scale in Norway?

6. In what respect may the sites of Oslo (Christiania) and Trondhjem be compared with those of Göteborg and Stockholm?

7. Kiruna (page 315) has been called "the most amazing town in Europe." Work goes on there all the year round and iron ore is exported at all seasons. What is the difficulty of all the year round work and exportation at Kiruna and how are both made possible? Think of the *appearance* of the town at midday in midwinter.

8. Stockholm has been called "the granite city of the north," and "the Venice of the north." Comment upon the suitability of these titles.

CHAPTER XXXI.

DENMARK.

Denmark, which is only about one-eighth the area of the British Isles, consists of the northern part of the peninsula of Jutland and the islands lying between that peninsula and southern Sweden. She thus occupies a very important position at the entrance to the Baltic Sea. Physically, historically, racially and politically Denmark is very closely related to Scandinavia, especially to southern Scandinavia. It is the road along which in early times invaders passed and flowed over to the conquest of Scandinavia, using the two depressions described in the last chapter. How clearly Denmark leads the way to these Scandinavian gates a glance at the map will show. At one time the whole region (Scandinavia and Denmark) was under Danish rule, but first Sweden, and later Norway, broke away. In the middle ages the Baltic Sea was of greater world importance than to-day, and Denmark, the controller of its entrances, was a very important country with many colonies. But the decline of the Baltic, the loss of Sweden and Norway, the loss of her southern provinces to Prussia in 1864, and the subsequent cutting of the Kiel Canal, have much depreciated the importance of her physical position, as well as of her world importance. In accordance with the Treaty of Paris (1919) a plebiscite was taken in northern Schleswig and in part of central Schleswig, with the result that the northern part of the disputed area went to Denmark and the southern to Germany.

PHYSICAL FEATURES.

Denmark is the only country in Europe which has no land exceeding 600 feet in elevation. Its average elevation, however, exceeds that of Holland, and its surface is not by any means a flat plain, but an undulating lowland. Physically, Denmark is a continuation of the North German Plain, which it resembles in being strewn with glacial deposits of sand and clay. It has, therefore, also a close resemblance to the lowlands of southern Sweden. Along the west coast there is a belt of sand dunes and beaches, whilst along both west and east margins the chalk measures, which underlie the country, appear at the surface and aid in giving diversity.

The island of Bornholm deserves special mention, for, unlike the rest of Denmark, it consists of ancient rocks and has high granite cliffs. It is a detached portion of the Scandinavian massif.

CLIMATE.

In Fig. 64 the boundary between the Western European region and the Baltic region is drawn through Denmark. This is because it really is a transition between the two types. It is more equable than the typical Baltic lands, *e.g.* Scania or North German Plain, for it is practically surrounded by the sea, but it is rather more extreme than eastern England. The mean January temperature is about freezing point and the July temperature thirty degrees higher. The rainfall is very evenly distributed—the sand dunes on the west coast receive most—and amounts to an annual average of about 25 inches, which is equal to that of London. The rain is brought by the westerly winds, which, owing to the low elevation, blow very steadily across the country. In winter, spells of bitterly cold east winds are frequently experienced.

OCCUPATIONS.

Nature has not richly endowed this small country. She possesses no coalfield, no metals, little building stone, no important river, and, owing to the lowness of the country, no water-power, whilst her soil is at best only poor, and considerable areas are practically useless. But by dint of intelligence, perseverance and enterprise, qualities ingrained in former generations of Danes by their great maritime exploits, and never lost by their descendants, the people of Denmark have in recent years built up an agricultural industry that is at once the model and the envy of many larger countries. The Danish farmer, on lands which the average British farmer would despise, by scientific farming raises crops and animals of the very best quality. He has also reduced the emigration problem to small dimensions.

Of the total area of Denmark 80 per cent. is productive, leaving 20 per cent. unproductive. The unproductive parts, of which one-sixth is peat-bog, are chiefly in the west and centre of Jutland, leaving eastern Jutland and the islands as the most productive parts of the country. Of the productive parts of the country, 6 per cent. is forested, chiefly beeches and pines, and of the remainder (about 75 per cent. of the whole country) rather more than half is pasture and meadows, and rather less than half is arable land.

Agriculture.—The rather severe climate, and especially the almost constant high humidity of the air, together with the sterility of much of the soil, combine to make pastoral occupations of greater importance than agriculture. The soil has been enriched by artificial manures, and, by careful tillage, large crops of oats, barley, rye, beetroots, potatoes and fodder plants are grown. But cereals are grown in insufficient amounts to supply the nation's needs, and have to be imported. This is particularly the case with wheat, of which comparatively little can be grown.

Dairy-Farming.—It is for her dairy-farming that Denmark is chiefly noted. During the last thirty-five years enormous progress has been made. The number of cattle and pigs has greatly increased, and with it the production of butter, cheese and bacon; whilst the value of the exports has increased enormously, and this increase has taken place despite the loss of the southern provinces and the cutting of the Kiel Canal. But the most remarkable features have been the improved quality of the animals themselves, the marked increase in the milk yield per dairy cow per year, and the maintenance of a very high standard of quality in all forms of dairy produce. These results have been largely brought about by the application of science to dairy-farming, and by the development of co-operative farming. The individual farmer raises his products, but the Co-operative Dairy collects and grades them, prepares the bacon and converts the milk into butter, all at a more economical rate than is otherwise possible. The societies also give scientific advice on all points in connection with the industry, whilst the government officials inspect the sanitary conditions of farms and factories. It is interesting to note that about three-fifths of the Danish dairy products are bought by Britain. Horses and sheep are also reared.

Another important factor which has aided this agricultural development is the Danish law as applied to the holding of land. The soil is greatly subdivided, owing to the prohibition of the amalgamation of small farms into large estates. On the other hand the parcelling out of landed property is encouraged. The law also leaves the tenant entire control of his land so long as he pays his rent.

Fishing.—The west coast of Denmark is very poor and has no good harbours, but its shallow waters are good plaice-fishing grounds. The quiet waters of Liim Fiord, made as recently as 1825 by a great inundation of the sea, is a noted "nursery" for young plaice from the North Sea. *Esbjerg,* the best harbour of the west coast, is the chief fishing centre.

Manufacturing.—The lack of minerals, except the china clay of Bornholm, which is made into porcelain at Copenhagen, limits manufacturing either to articles in connection with agricultural and pastoral pursuits, or to the building of ships. Agricultural implements, sugar (from the beet) and margarine are growing manufactures. Shipbuilding is carried on at the ports.

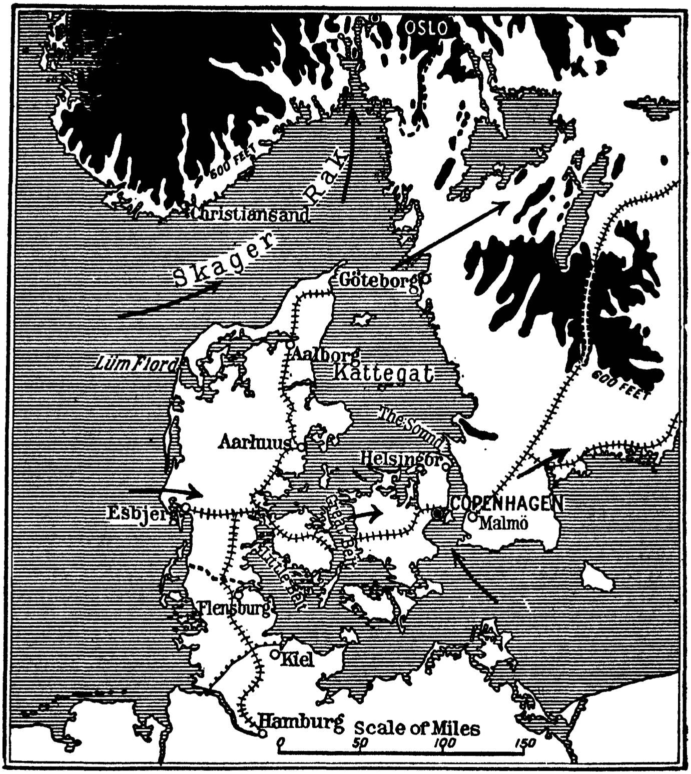

FIG. 70.—Denmark.

CHIEF CITIES AND ROUTES.

Two important sets of routes are controlled by Denmark: the sea routes to the Baltic (excepting, of course, the Kiel Canal) and the ferry-train route from Esbjerg to Stockholm. The Danish islands of Fünen and Zealand are so placed that there are three passages from the

Kattegat (=Cat's Throat) to the Baltic—the Little Belt, the Great Belt and the Sound. Of these the Sound is by far the most important, for despite the drawback that it is shallow, so shallow that some heavily laden large vessels are compelled to lighten at Copenhagen, it offers a more direct route than the Great Belt, whose advantage of greater depth is annulled by dangerous currents and sandbanks. The Little Belt is of comparatively small importance as a highway into the Baltic.

Copenhagen (= The Merchants' Haven), the capital of Denmark, commands the Sound. Including the suburbs, it has a population of over three-quarters of a million, which is one-fifth of the total population of the country. The city is built on a narrow strait between Zealand and the small island of Amager which gives it a protected harbour, the best in the country. Its command of the Sound has made it a great collecting and distributing centre for the produce of the Baltic region, and particularly for Swedish and Russian dairy produce. This entrepôt trade is aided by the fact that Copenhagen is a free port. Until 1857 the Danes collected dues from all ships using the Sound. These were collected at Elsinore, famous as the scene of Shakespeare's great tragedy of *Hamlet.* The strait is narrowest at this point.

The second great route of Denmark also passes through Copenhagen. The construction of the Kiel Canal was a great blow to Denmark, both strategically and commercially. To meet the new competitor the Danes have developed a means of quick transport, without break of bulk, from the west Jutland port of *Esbjerg,* to Malmö and Stockholm in Sweden. This is accomplished by means of railway and ferry boats, the latter being used to transport the trains across the two Belts and the Sound (see Fig. 70).

Aalborg, on Liim Fiord and *Aarhuus,* on the east coast of Jutland, are small ports engaged in cattle and grain trade.

The Faröe Islands (= Sheep Islands), an isolated group of volcanic islands lying midway between the Shetlands and Iceland, support about 23,000 people, whose occupations resemble those of the Orkney and Shetland Islands—*i.e.* sheep-rearing, fishing, etc.

ICELAND.

Iceland, whose area is equal to that of Ireland and Wales combined, is a very mountainous island. Its elevation, combined with its high latitude, results in the greater part being covered with snow-fields and glaciers. The chief inhabited areas are small lowlands in the south and south-west. These have been built up of glacial débris brought down by rivers. Elsewhere the coasts are high, and in their deeply indented character resemble the coasts of Norway. The island is largely built of basalt, which suggests volcanic activity, past or present. There are scores of volcanoes, active or extinct, and numerous geysers or hot springs. Mount Heckla is the best known volcano in the island.

The 110,000 inhabitants live on the south and south-western lowlands, where there are rich pastures in the short summers. Cattle, sheep and ponies are reared. Fishing is also carried on. *Reykjavik,* on the south-west coast, is the capital and centre of the legislature, for although Iceland is ruled by the King of Denmark, the island now possesses its own constitution and enjoys home rule. It has a population of about 28,800.

EXERCISES.

1. Describe the natural advantages and disadvantages possessed by Denmark. How far have the advantages been made use of, and how far have the disadvantages been overcome?
2. Criticize the giving of the name "fiord" to Liim Fiord.
3. Give an account of the Co-operative Dairies of Denmark. How do they help the farmer? How can they help him if the market for Danish dairy produce is not favourable?
4. What geographical advantages of site are possessed by Copenhagen? If possible consult a large-scale map and make a summary of these advantages in the form of a sketch-map.
5. How has Denmark met the competition of the Kiel Canal?
6. What links has Denmark with (*a*) Central Europe, (*b*) Scandinavia? Which are the stronger? Why?

CHAPTER XXXII.

CENTRAL EUROPE: GERMANY.

GERMANY is essentially a continental area, occupying a central position in the Continent of Europe. It lies a little farther south than Britain, for its average latitude is about that of London. The capital, Berlin, is in the latitude of Birmingham.

PHYSICAL FEATURES.

Germany readily falls into two main physical units: Low Germany, or the North German Plain, and High Germany, or the Southern Highlands.

The North German Plain.—This plain is about half the size of the whole country. All the German coasts are in this physical unit. On the North Sea there are 300 miles of coastline, on the Baltic some 800 miles, and on the whole 1,100 miles there are very few stretches which can be described as other than poor. The North Sea coasts are low plains, some below sea-level and protected from inundation by sand dunes and dykes as in Holland. These low plains, which may be compared with the English Fens, have been extensively drained and form good agricultural land. Behind the fenland are heath-covered sandy wastes known as the *geest*. The Baltic coasts are rather higher and there are no fenlands, but the sea is shallow and the sandy coast gives few harbours. Even the river mouths are of little value owing to the action of currents which build sandpits or bars across them. These enclose lagoons, called *haffs,* in which the rivers deposit their load of débris and build up deltas.

The land behind the coastal belt is extensively covered with glacial débris, which attains the dimensions of hills known as the Baltic Heights. These stretch from the Valdai Hills in Russia to the Elbe in Germany, with extensions northwards along the east coast of the Jutland Peninsula. An atlas map should show a very large number of small lakes in this upland morainic belt. The pine-covered Baltic Heights are responsible for a very marked feature in German rivers. Notice how they suddenly change direction in their middle courses. For example, the middle Elbe appears to be making for the western end of the Baltic, but a fortunate bend takes it out to the incomparably more important North Sea. Notice also the large number of east and west rivers which flow between low ridges of glacial drift, etc. These render the making of canals for east and west transit a matter of comparative ease (see Fig. 71).

The rest of the North German Plain consists of sandy and boulder clay covered areas: the former being comparatively poor and infertile, but yet extensively devoted to potato growing, the latter providing the richer beet-producing lands.

The Southern Highlands.—This part of Germany is a portion of the Central European belt of ancient massifs. It is a very highly complicated region of ancient folded ranges worn down to their stumps and then uplifted, of fractured and tilted blocks of the earth's crust, of basin-like depressions, and, in places, of past volcanic activity. This complexity of structure and relief is reflected in its complicated political history, for whereas the uniformity of the northern plain encouraged the growth of one dominating political power, Prussia, the southern highlands are divided into a number of political units. We may divide the southern highlands into the following physical divisions:—(i) The Lower Rhine Highlands, (ii) the Rhine Rift Valley and its adjacent Highlands, (iii) the Highlands radiating from the Fichtel Gebirge, (iv) the Alps and the Alpine Foreland.

(i) The Lower Rhine Highlands, through which the river has cut a narrow gorge between Bingen and Bonn, is an ancient peneplain which has been uplifted. As gradual uplift took place the river maintained its course by cutting and progressively deepening its gorge. The Rhine and its tributaries, the Moselle and the Lahn, have divided these highlands into four blocks. Of these the Eifel region, of which the Ardennes of Belgium are an extension, is famous for its extinct volcanoes and its crater lakes (see Fig. 71).

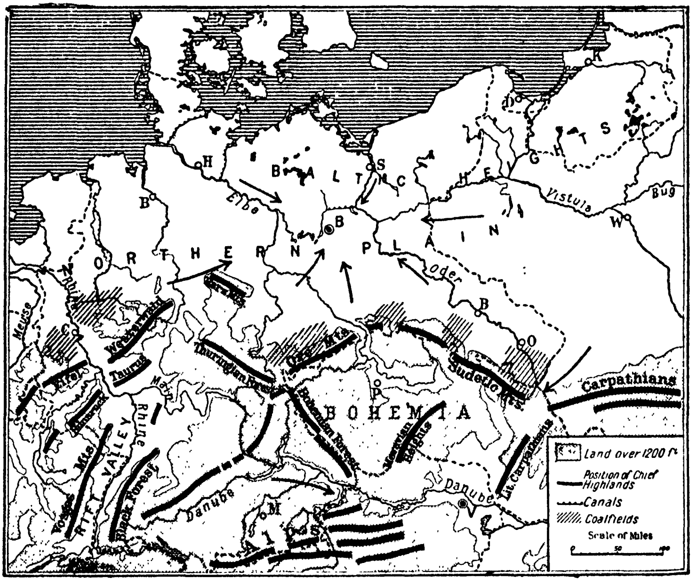

FIG. 71.—The German Plain and the Highlands of Central Europe.

(ii) The Vosges and the Black Forest (Schwarz Wald), together with their northern extensions, once formed a single block, whose central part subsided between a series of parallel faults, and thus formed a *rift valley* some 200 miles long and twenty miles broad. This valley, which stretches from Basel to Mainz, is the middle basin of the Rhine and is in marked contrast to the narrow gorge between Bingen and Bonn. Its floor has been covered by alluvium so that it is a region of great fertility. On either side of the valley the steep escarpments rise abruptly from the plain, but on the outward slopes the descent is more gradual.

(iii) The ridges radiating from the Fichtel Gebirge should be studied on a physical map. The Bohmer Wald (= Bohemian Forest), the Erz Gebirge (= Ore Mountains), the Riesen Gebirge (= Giant Mountains), the Sudetes and the Moravian heights form a highland framework for the low, diamond-shaped Bohemian plateau, really a basin depression filled with more recent measures. The Franconian and Swabian Jura and the hills forming the basins of the Main and the Neckar, are scarplands whose steep faces look north-westward. The Harz Mountains, an isolated mass of ancient rock, mark a continuation of the line of the Sudetes, as do the Weser highlands further north-west.

(iv) The Alps and the Alpine Foreland are in the extreme south. Germany possesses a small part of the outer ranges of the northern Alps. Nowhere does the elevation exceed 10,000 feet, although the Zugspitze, the highest point, only falls short of this by about 300 feet. The Alpine Foreland is a low plateau, largely covered with morainic hills and lakes in the south, and by beds of porous gravel further north. In the southern portions the gravel is very thick, but towards the north it becomes so thin that the underground water comes to the surface and forms swamps, as in the district north of Munich.

CLIMATE.

We have learned that Germany consists of a great plain in the north and a highland region of moderate elevation in the south. The effect of this is seen in the distribution of temperature, for the elevation of the south counteracts the influence of latitude, and results in a remarkably uniform temperature distribution.

Only in the rift valley are there seven months with a mean monthly temperature exceeding 50° F., whilst this is the only part of the country which has one whole month exceeding 68° F. It should be noted, too, that the further east we go, the climate becomes a little more extreme. This is corroborated by the fact that the number of days when the temperature falls below freezing point increases as we go eastwards.

The rainfall is brought by the prevailing westerlies, and its distribution shows a marked connection with the relief, although, as should be expected, the amount diminishes from west to east. This is clearly shown on the northern plain, whose western half is better watered than its eastern half. All the highlands are well watered and are usually forest-clad.

German Rivers.

Most of the rivers of Germany rise in the central highlands and flow northwards to the North Sea or the Baltic Sea. The Rhine and many tributaries of the upper Danube rise in the Alps, but the former is the only river which links the Alps with either of the northland seas. The upper Danube rises in the Black Forest and flows across the Alpine foreland plateau. All the other rivers have the most important part of their courses on the northern plain. Of these, the chief are the Oder, whose course from Silesia to its mouth lies in Germany, the Elbe, whose upper course is in Bohemia, and the Weser and the Ems, two entirely German rivers. We have already noted: (i) the remarkable development of east and west flowing tributaries, which has aided the construction of canals between the different rivers; (ii) the change in direction which occurs in their middle courses; (iii) the shallow haffs at the mouths of those rivers flowing to the Baltic. The bending in the courses of the rivers has also the interesting commercial effect of robbing some of the ports of their natural hinterlands. Thus, the lower Elbe continues the direction of the upper Oder, so that Hamburg and not Stettin is the chief port for Silesian trade. Similarly the upper Elbe

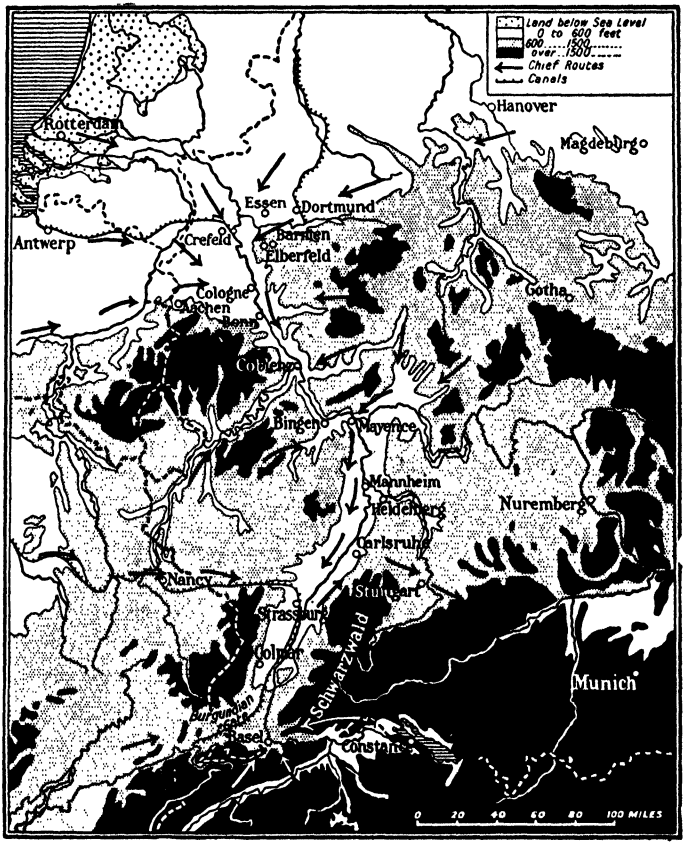

FIG. 72.—The Basin of the Rhine.

is in as direct rail communication with Bremen as with Hamburg. At first sight it appears very strange that the Elbe should flow northwards and then cut its way through the Ore Mountains, instead of flowing southwards to the Danube through the low Moravian Hills. The explanation is simply that the river flowed northwards before the mountains were formed, and that as the mountains grew the river kept pace by steadily cutting and deepening its bed. Thus it cut a gorge-like transverse valley, known as the *Elbe Gate,* through which the main route between Berlin and Vienna passes.

The Rhine.—This is the most important river, not only in Germany but in Europe. In its Alpine course many of its head-streams rise near the St. Gothard mass, whilst most of them pass through lakes, which act as filters, before they join the main stream above Basel. The chief are the Vorder Rhein and the Hinter Rhein (which unite to form the main stream), the Reuss and the Aar. After passing through the large Lake Constance, in which it is building a delta, the Rhine enters upon its Alpine foreland course, and soon plunges over the Falls of Schaffhausen. It should be noted that from Lake Constance to Basel the river forms the political frontier between Germany and Switzerland. At Basel a course along the floor of the rift valley between the Vosges and the Black Forest is entered upon, and the tributaries Neckar and Main are received. At Bingen the Rhine enters its magnificent gorge, the part of the valley famous in song and story, and receives the Lahn on the right bank and the Moselle on the left bank. Both of these rivers flow in gorges. Below Bonn the Rhine enters upon its course across the narrowest part of the European plain, and soon leaves Germany for Holland, but before doing so, it receives from the right bank the important tributary the Ruhr, which drains the richest German manufacturing district. In Holland the Rhine is divided into great distributaries and joins with the Meuse to make a combined delta.

The great German rivers (Rhine, Elbe and Oder) have been internationalized, and their navigation is free to all nations.

CHIEF OCCUPATIONS.

Forestry.—Long ago the greater part of Germany was clothed with forests. To-day about one-quarter is covered with forests, which are very carefully and scientifically looked after. Most of the southern highlands are forested, hence the frequency with which the word *wald* (= forest) is applied to them. Two-thirds of the forested areas consist of conifers, among which the silver firs of the Black Forest and the Vosges, the firs, pines, spruces and larches of the Alpine foreland, the Fichtel Gebirge (= Fir Mountains), the Sudetes, etc., and the pines and firs of the Baltic heights are noted. Deciduous forests cover one-third of the forested area. They include the oaks of southern Germany and the beeches of the Baltic borderlands. Along the sandy, wind-swept North Sea margins the natural vegetation is moorland, heath and grass.

The forests of the southern highlands yield valuable timber, which is sawn up by power derived from the waterfalls and then floated downstream to the markets. They have also led to the establishment of the famous toy industries of Nuremberg (the "toy capital" of the world), Gotha and other towns. Originally this must have been carried on as a spare-time occupation, but it has grown to such dimensions that toys are dispatched to all parts of the world. Nor are the toys confined to those made of wood. All kinds of mechanical and other toys, made of different materials, are now manufactured. The industry has also spread to other things, so that clocks, surgical and musical instruments, and mechanical and mathematical appliances are all made at most of the toy-making centres. The burning of charcoal for fuel is also extensively carried on.

Agriculture.—In point of acreage under various crops the following agricultural products are arranged in order of importance: rye, oats, potatoes, wheat, barley, beet, vines, hops, tobacco. There are also considerable areas of apple, pear, plum and cherry orchards.

The northern plain, despite its rather severe climate, is the chief agricultural region. Naturally infertile, except in places covered with boulder clay, this plain has been made productive by the application of science to agriculture. Careful drainage and heavy manuring, especially with artificial manures from the Elbe basin and from Chile, have worked great changes, so that to-day about half of the plain is under crops. Even moorland areas have been reclaimed by the removal of the peat and the subsequent addition of sand and manures, the sand to lighten the heavy subsoil.

The chief crops are rye, from which the so-called black bread is made, oats, wheat (grown on the richer loess soils of Saxony and Silesia), potatoes and beet. Flax and hemp are also grown and exported from the Baltic ports. The industrial bias of German agriculture is shown in the number of alcohol distilleries and starch factories (both based on the potato), beet sugar factories and linen mills. The chief beet-producing areas are in the centre and north-east, and important sugar-refining towns are Magdeburg, on the Elbe, and Frankfurt, on the Oder.

Most of the wheat, barley, vines, hops and tobacco are grown in the river valleys and basins of the southern highlands, the richest part of which is the alluvian plain of the central Rhine rift valley. Most of the sunny slopes of the river valleys are terraced and on these the vine flourishes. Hops and tobacco are extensively cultivated in Bavaria, where brewing is an important occupation at Munich and other centres.

Pastoral Occupations.—The pastoral occupations of Germany show an interesting connection with her agriculture development. During the last thirty years pigs have increased in numbers over 300 per cent., whilst sheep-rearing has decreased by the same amount. This is due to the breaking-up of pasture land on the northern plain in order to grow root-crops, particularly the beet, the food of the pigs after the sugar has been extracted. The keeping of cattle is carried on in almost all parts of the country, the numbers showing a steady increase. Some districts, *e.g.* those adjoining Denmark, are noted for their dairy produce. Kiel exports large quantities of butter, etc. Silesia and Saxony are the chief sheep-rearing regions.

Mining and Manufacturing.—More people are engaged in mining and manufacturing than in any other industry.

As a coal-producing country the pre-war Germany ranked third in the world, her output being exceeded by the United States and by Great Britain. Her output of iron was only exceeded by the United States. The loss of the Saar Basin coalfields and the iron-mines of Lorraine have been keenly felt by the new Germany. The chief coalfields are three in number: (i) The Ruhr Valley or Westphalian Coalfield, (ii) the Saxon Coalfields, (iii) the Silesian Coalfields. It should be noted that all three are located on the margins of the central highlands.

(i) *The Ruhr Valley or Westphalian Coalfield.*—This coalfield is the chief industrial area in the country. More than half of the total output of coal is mined there, whilst one-fifth of the total population is concentrated within its boundaries. Iron, as well as coal, is found, but not in sufficient amounts to supply the iron and steel works, so that in normal times the industry is dependent upon imports from Lorraine, Luxemburg and Sweden. The Lorraine and Luxemburg ores are of inferior quality and were little worked until the Thomas or basic process, discovered in 1879, made it possible to remove the phosphorus from the pig-iron during the process of converting it into steel. The great waterway of the Rhine, which is the chief entry for imported ores, the numerous canals and the excellent railway facilities, render the importation and distribution of imported ores a matter of comparative ease. The same facilities also assist the importation of raw materials for the textile trades (cotton, wool, etc.), and of grain for food. The vast Krupp iron and steel works, in which all kinds of war material are manufactured, are at *Essen*; at *Dortmund* and *Düsseldorf* all kinds of hardware are made, whilst *Solingen* is noted for its cutlery. The twin city of *Elberfeld-Barmen* manufactures chemicals, but is perhaps noted more for its silk, cotton and woollen goods. *Krefeld,* as a silk manufacturing town, ranks with Milan and Lyons. *Duisburg, Düsseldorf* and *Cologne* are the great river ports. Near the Belgian frontier, but not on the Ruhr valley coalfield, stands *Aachen,* noted for its woollen goods, particularly blankets and broadcloths. It stands on a detached portion of the Franco-Belgian coalfield.

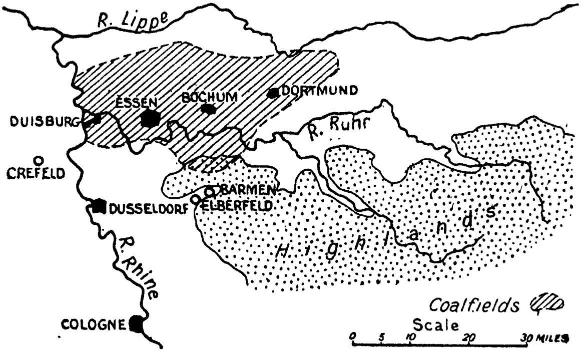

FIG. 73.—The Ruhr Industrial Area. Note the position of Duisburg, the chief river port for the area.

From a German standpoint this great industrial area suffers from one serious drawback. Its natural outlet is along the Rhine, and the mouth of that river is controlled by Holland. Another outlet lies across Belgium. On this account Rotterdam in Holland and Antwerp in Belgium have an enormous transit trade. In order to attract some of the trade to German harbours the Dortmund–Ems Canal was constructed, but even cheap rates and patriotic appeals have not deflected much trade from the natural outlet. In this connection it may be pointed out that less than half of the pre-war German trade with Britain was conducted through German ports.

(ii) The Saxon *Coalfields* are much smaller than the one just described. The coal is found in two areas: one, the larger, extends from Zwickau to Chemnitz; the other is near Dresden. Iron ore, as well as tin, silver and zinc, is obtained in the Ore Mountains, but much iron has to be imported from Lorraine and Sweden. *Chemnitz* and *Zwickau* are the centres of a group of textile manufacturing towns. Chemnitz specializes in shawls and hosiery, but much of the actual manufacturing is carried on in the homes of the peasantry. The raw cotton is received by rail from Bremen, and much of the wool is obtained locally. *Dresden,* the capital of Saxony, stands on the Elbe. The famous Dresden china is made at Meissen, several miles further down the valley. The city is noted for its art galleries, museums, etc. *Leipzig,* situated on the plain, just north of the highlands, is not on the coalfield, but is one of the most important cities in Germany, owing to its central position with regard to inland trade. Its great fairs attract merchants from all the countries of Europe. It has extensive printing works, and manufactures all kinds of musical instruments, especially pianos. The University of Leipzig is one of the largest in Germany.

(iii) *The Silesian Coalfields.*—Coal is mined in the districts of Breslau and Waldenburg, but principally in southern Silesia. There, in the region of the Moravian Gate, and extending into Poland, is one of the largest coalfields in Europe. Its content exceeds that of the Ruhr valley, but the quality of the coal is not so good. The Riesen Gebirge (= Giant Mountains), the Sudetes, and the low plateau of southern or Upper Silesia are all rich in iron, lead and zinc. Upper Silesia is one of the chief iron producing areas in the new Germany.

This combination of coal and valuable minerals, together with an abundant local supply of wool, has led to the growth of many manufacturing towns, but as this development is comparatively recent, partly owing to its somewhat isolated position, there are at present very few large towns. *Breslau,* the Silesian capital, *Liegnitz* and *Görlitz,* all in Lower Silesia, are woollen manufacturing centres, manufacturing not only local wool, but imported wool from Argentina, Australia, etc.

The *Harz Mountains* are the centre of varied mining occupations. Lignite, iron, silver, and other minerals are mined. In the *Stassfurt* district, which lies near the eastern base of the Harz, there are great deposits of rock salt and of potash salts. Not long ago the potash salts were known as rubbish salts, but it is to them that modern German agriculture largely owes its great progress. Stassfurt has great chemical works, which prepare chemicals for use in textile trades, and for use as artificial manures in agriculture.

CHIEF ROUTES AND CITIES.

Berlin, the capital, is the centre of the railway system, for no part of the country is more than twelve hours by rail from it. The city stands on the Spree, a few miles below its confluence with the Harvel, a tributary of the Elbe. It occupies a splendid position for its function as capital, being centrally placed in the northern plain almost at the intersection of diagonals from the four corners of the country. Built amid an infertile lakeland country, it owes the fixing of its site to the fact that the routes converging upon it found an easy crossing-place of the Spree at a point where the firm banks, the narrow river and the presence of an island facilitated bridging. The Hamburg–Breslau–Cracow–Odessa and the Paris–Cologne–Warsaw–Moscow (or Leningrad) lines meet at Berlin. Other routes reaching Berlin are equally important, *e.g.* those to Munich and Vienna and thence to northern Italy and Venice. They should be looked up and studied on the map (see Fig. 71). Like most large centres of population, Berlin has become a great manufacturing city, especially of machinery, clothing and scientific instruments.

The site of *Magdeburg* is in some respects equal, if not superior, to that of Berlin. It is centrally placed, it commands east and west routes along the margins of the central highlands, it has the advantage of being on the Elbe, the great central river, and it is in an excellent position with regard to routes to Munich and Venice. The city, however, has suffered from political and religious troubles, and these were especially in evidence at the time when Berlin began to be of importance. We have in Magdeburg another example of a city which has developed at a point where a great route —here the route skirting the margin of the central highlands—found an easy crossing-place of a river owing to the presence of islands.

The Rhine Valley is followed by railways throughout its length in Germany. This is, of course, a matter of ease, except in the gorge section, where the valley is sometimes so narrow that there is barely room for river, road and railway. Some of the most important cities in Germany are on or near the Rhine, and all command important routes. *Cologne* has a site whose leading feature is that of many other cities—*i.e.* it stands where an important river leaves its mountain course for the plains. It also stands where the great roads and railway routes skirting the mountains meet the routes following the river, whilst all routes from various parts of the plain and from the ports—*e.g.* from Antwerp, Rotterdam, Emden, Bremen, etc.—must come to it before they can proceed along the narrow gorge (see Fig. 72). Another important factor in its site is that it stands at the normal navigation limit for ocean-going ships. It is a river port for the Westphalian industrial area, and has important textile, glass and chemical industries of its own. Special manufactures are of scent and chocolate. As its name implies, Cologne (= the Colony) is an old Roman town. The Rhine formed the frontier of the Roman Empire, and therefore we find several Roman cities on or near the left bank, *e.g.* Coblenz, Mainz, Strassburg and Basel. *Coblenz* (= the Confluence) stands half-way along the Rhine gorge at the confluence of the Moselle and the Rhine, and sufficiently near the point at which the Lahn enters the main stream, on the opposite bank, to draw to itself the importance of being at its confluence. It is thus a great meeting-place of routes up and down stream, from France and Luxemburg via the Moselle valley, and from Hanover and Magdeburg via the Lahn valley. *Mainz* stands at the northern end of the rift valley of the middle Rhine, opposite the confluence of the Main and the Rhine. It commands the very important rail routes following the Rhine to the Main valley, and across the Palatinate and lower Lorraine. *Frankfurt* (which should not be confused with Frankfurt-on-Oder) also stands at the head of the rift valley at a point where many routes meet. It is a great banking and commercial centre. *Mannheim,* built on the low ground at the confluence of the Neckar and the Rhine, is the normal head of the river steamer navigation.

The *Orient Express Line* (Paris-Constantinople) enters Germany soon after leaving the French city of Strassburg. It winds round the northern base of the Black Forest to Stuttgart, and from thence via Ulm, at the navigation limit of the Danube, to Munich, the Bavarian capital. *Munich,* the third largest city in the country, has grown with great rapidity during recent years. The chief town of the Alpine Foreland, it stands on the Isar, between forests to the south and marsh and moor to the north (see p. 329), at the meeting-place of two great sets of routes. The first set includes the route which skirts the northern margins of the Alps from Basel via Munich to Vienna, and the Orient Express route from Strassburg via Stuttgart and Munich to Vienna. The second set of routes is at right angles to the first. Routes from the northern plain converge upon Munich, which occupies a splendid position for controlling the Trans-Alpine Brenner route, via the Inn valley, the Brenner Pass, and the Adige valley, to the plain of Lombardy. These two sets of routes do not meet on the Danube, hence the position of Munich south of that river. The city has important engineering (locomotives and motor-cars) and brewing industries. The lack of coal is partly compensated for by an abundance of water power.

The *inland waterways* of Germany form a very complete river and canal system. As we have seen, ocean steamers can ascend the Rhine to Cologne, large river steamers to Mannheim and Frankfurt, and smaller ones to Strassburg, where they may proceed by canal to the Seine or Rhone basins. Small river steamers may also navigate the Main, and at Bamberg enter Ludwig's Canal, which will take them via Nuremburg, on the Ostend-Vienna Express route, to the Danube near Ratisbon. There are now on foot vast schemes, not only to increase the capacity of this canal, but also to carry out extensive canalization of the Main and the upper Danube.

We have also seen that the Rhine is connected to the Ems by the Dortmund-Ems Canal. The Elbe and Oder are connected by the Friedrich-Wilhelm Canal, but at present they have no connection with the Weser. The Oder is connected to the Vistula, now a Polish river, by two canals. The Elbe estuary is brought in close connection with the Baltic by two canals, one from Hamburg to Lübeck, and the other, the famous Kiel or Kaiser Wilhelm Canal. The latter is a ship canal, whose enlargement was completed in 1914, so that it can now take the largest steamships. The Kiel Canal, the Rhine, Elbe, Oder, Vistula and Danube are now international waterways, open to the ships of all nations.

The Foreign Trade and Chief Ports of Germany.

The normal foreign trade of Germany has some resemblance to that of Britain. Her imports are in the main foodstuffs and raw materials for manufacture, and her exports manufactured goods. Germany is, however, not so dependent as Britain upon foreign countries for her food supply.

Her foreign commerce is carried on through many ports, some of which are not in the country itself —*e.g.* Rotterdam and Antwerp. *Hamburg,* the chief continental port—and by far the chief German port—grew up at a convenient crossing-place at the head of the estuary of the Elbe. The extensive system of railways and navigable waterways which converge upon the Elbe estuary gives it a hinterland which includes not only the whole of the Elbe basin, but also the middle and upper basin of the Oder, including Silesia. The port is also a great industrial centre, with shipbuilding and repairing, wheat-milling, soap-making and other industries. Hamburg and Altona, its neighbour, have a combined population exceeding 1,300,000. Its chief import trade is in American produce, and in this respect it may be compared with Liverpool. Its outport is Cuxhaven, a busy fishing port. Hamburg and Bremen carry on between them the bulk of Germany's American trade. *Bremen,* an older port than Hamburg, stands on the Weser, some thirty-five miles from its mouth. Owing to the increased size of modern steamers the outport of Bremerhaven has been established for the accommodation of the largest ships. It is worth while noting here that most of the large ports on the Atlantic seaboard of Europe are built on estuaries some distance from the open sea—*e.g.* London, Bristol, Hamburg, Bremen, Rouen, Nantes, etc. In each case it has been necessary to construct outports in order to deal with large modern ships. Bremen has a large import trade, particularly of cotton, rice, tobacco and other American goods. *Wilhelmshaven,* on Jade Bay, an old estuary of the Weser, is well placed for its function as a naval station.

The chief Baltic ports are *Kiel, Lübeck, Rostock, Stettin,* and *Königsberg.* The approach to most of these ports is difficult owing to the formation of haffs. It is, therefore, necessary for the provision of outports in order to accommodate the larger ships. The trade of the Baltic ports is in Baltic produce, *i.e.* dairy produce (especially in the west), grain, sugar and potatoes; timber, hemp, flax

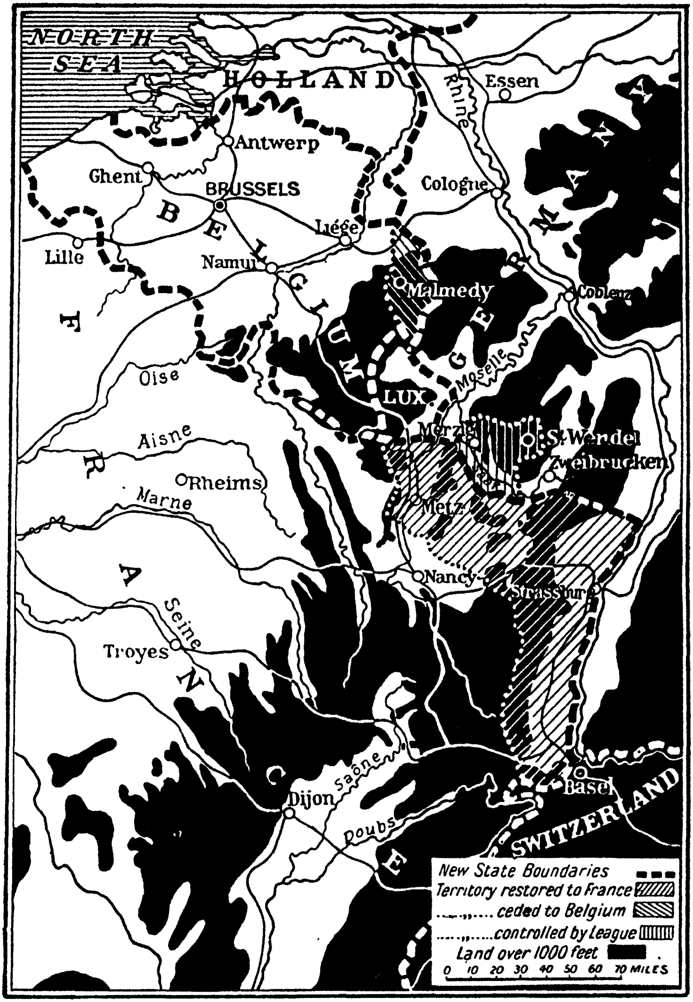

FIG. 74.—The New Western Frontier of Germany.

Find the Saar Basin, whose political future will be determined by a plebiscite to be taken in 1935.

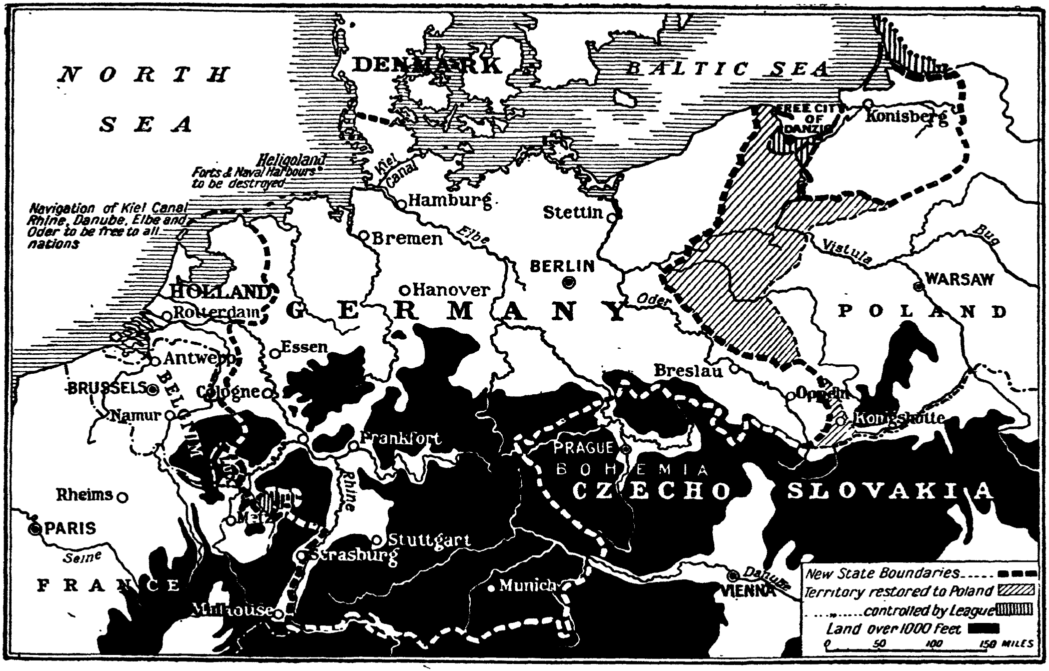

FIG. 75.—The New Germany.

(particularly from the eastern ports). Most of the Baltic ports are engaged in shipbuilding, in which industry they are more important than those on the North Sea—except Hamburg.

Stettin (outport Swinemünde), the third port in the country and the chief port of Prussia, stands on the Oder. It has extensive shipbuilding (*e.g.* the famous Vulcan yards) and sugar-refining industries. *Lübeck,* once more important than Hamburg, was the chief of the cities which formed the Hanse League for the extension and protection of commerce. *Kiel,* the chief port of an important dairy-farming region, has a large shipbuilding trade.

THE NEW GERMANY.

Fig. 75 gives the boundaries of Germany as fixed by the Treaty of Versailles, 1919. The loss of Alsace-Lorraine, the Saar basin (see Fig. 74), the small Malmédy strip, German Poland and the ports of Danzig and Memel; the isolation of East Prussia from the rest of the country; the large indemnities which have to be paid, as well as the loss of all her colonies, are all matters which will seriously handicap the new Germany. Germany is now a member of the League of Nations and has once more entered into full relationships with other countries. There is sufficient genius in her people to raise from the ruins of her former greatness, a state which cannot help but take a leading part in the world's affairs. The amazing progress made between 1871 and 1914 is sufficient evidence of this.

EXERCISES.

1. Into what natural regions may Germany be divided? What differences in relief, climate, products, history, etc., can you point out between these regions?

2. On a large-scale map of Germany mark: (*a*) the railways radiating from Berlin and also those of the Rhine basin; (*b*) the chief canals; (*c*) the coalfields and the districts producing iron. Then mark the ports of Bremen, Hamburg, Stettin and Königsberg,

and by means of curved lines mark as accurately as possible the areas which form their hinterlands.

3. "The river and canal highways of Germany partly compensate for the great distance from the sea of many inland manufacturing towns." Give evidence in support of this statement.

4. Why is it that the import and export statistics of Holland and Belgium include enormous quantities of raw materials and manufactured goods neither destined for home consumption nor produced in home workshops?

5. Show how geographical conditions have aided the growth and importance of Berlin, Cologne, Munich, Breslau, Coblenz. Add sketch maps to illustrate the points brought out in your written description. (See Figs. 67 and 82).

6. "The readiness of the German people to apply the results of scientific research to agriculture and to manufactures was one of the most potent factors in her remarkable progress from the Franco-German War to the fateful year of 1914." Apply this to the use made of the ores of Lorraine, the beet sugar industry, the use of Stassfurt salts and the manufacture of aniline dyes. If necessary look up the facts in some encyclopædia or other reference book, and note in which of these instances the inventions were those of Englishmen.

7. What do you understand by internationalized rivers? Give examples from Germany, and in each case give reasons for the internationalization of the river concerned.

8. Describe the character of the coastline of Germany with special reference to the provision of harbours and of access to the interior. Compare with the coastline of Norway.

CHAPTER XXXIII.

CENTRAL EUROPE: THE DANUBE LANDS.

GENERAL CONSIDERATIONS.

THE valley of the Danube was the highway by means of which the Crusaders passed on their adventurous journeys to the Holy City, and along which came invaders from Asia, who reached it either by way of the Russian steppes and the Carpathian passes, or by way of Asia Minor and the Balkans. It is thus a land which has been influenced by Europeans and Asiatics, by Christians and Mohammedans. Its physical features are as diverse as its peoples, so that the late dual empire of Austria-Hungary, which controlled most of its central area, was picturesquely called, " A Pudding-Stone of States," " A Conglomerate of Countries, Duchies and Principalities," " A Ramshackle Empire."

Physical Features.—In this chapter we shall chiefly consider that part of Central Europe which was formerly contained within Austria-Hungary, together with the new Rumania. It will be necessary, therefore, to include some areas, *e.g.* Bohemia, which do not strictly belong to the Danube basin. Physically, this eastern part of Central Europe is largely grouped around the Alpo-Carpathian system of young folded mountains, but even those parts which belong to this great system are so far-flung, so detached, and so differently placed that they do not form a single unit. The Eastern Alps; the great sweep of the Carpathians; the ranges bordering the eastern shores of the Adriatic

Sea; the Plain of Hungary, formerly a shallow sea which was filled with deposits brought down from the highlands by the rivers; the Bohemian plateau, a part of the Central European belt of highlands; and the Rumanian lowlands, which are really part of the Russian plain, are all distinct regions in themselves.

Peoples.—At its last census the population of the late dual empire was fifty millions, of whom twenty-one millions were in Hungary. It is remarkable that although that empire was known as Austria-Hungary, the largest single element in the population was neither Austrian nor Hungarian, but Slav. The Czechs of Bohemia and Moravia, the Slovaks of the north-western Carpathians, the Poles of Galicia, and the Ruthenians of eastern Galicia and the Bukowina, formed a belt of Slavonic peoples stretching across the north of the country. Another belt of Slavs extended across the south of the empire, and included Slovenes, Croats and Slavonians. Being so strong numerically it might be expected that politically they would at least be as powerful as the Austrians and the Hungarians. Two reasons for this were differences of creed and language. In the northern group the Czechs and the Poles are Roman Catholics, and the Ruthenians Greek Church like the Russians. Of the southern Slavs the Slovenes and the Croats are Roman Catholics, but Slavonians are adherents of the Greek Church, as might almost be expected, since their land gravitates eastwards. All these different peoples have their own languages. The break-up of the empire gave the Czechs and Slovaks the opportunity of uniting to form a northern Slav country, whilst the southern Slavs have joined with those of Montenegro and Serbia to found a strong Slavonic country under the leadership of Serbia. Galicia once more forms part of Poland.

The belt between the northern and the southern Slavs is largely peopled by Austrians in the west, and by Hungarians in the east. The Austrians are a Germanic people, who speak German, but unlike the Prussians, who are Protestants, they are Roman Catholics. The Hungarians, or Magyars, are Asiatics in origin, but their long residence in Europe—they entered Hungary in the ninth century—and the great ease with which they assimilate other races, have caused the physical characteristics of present-day Magyars to approximate to those of their European neighbours. They are mainly Protestants in religion.

Besides Slavs, Germans and Magyars, the empire had about three-quarters of a million Italians and over three million Rumanians. The Italians were chiefly found in the valley of the Adige, *i.e.* the Trentino, and in the districts at the head of the Adriatic Sea. The Rumanians were largely in the Hungarian province of Transylvania, where the steppe-dwelling Magyars settled in smallest numbers. These people are now united to Italy and Rumania.

How is it that an empire of such diverse physical units, and of so many opposing elements among its people, held together at all? The whole of the people, except the Jews, who form nearly five per cent. of the population in both countries, are Christians who combined to resist the Turk, an alien invader and of an alien religion. But the decline of Turkey broke this tie. The great highway of the Danube serves as a connecting link, but it is an imperfect one, and did not touch outlying parts of the late empire, *e.g.* Tirol, Dalmatia, Galicia, Bohemia, etc. The fact that the whole had the same ruler and a common army also helped. It had for many years been evident that what stability the Ramshackle Empire had, would, however, be very severely shaken, perhaps destroyed, by an unsuccessful war. The expected has happened.

NATURAL REGIONS.

This part of Central Europe may be divided into the following natural regions: (i) The Bohemian Plateau,

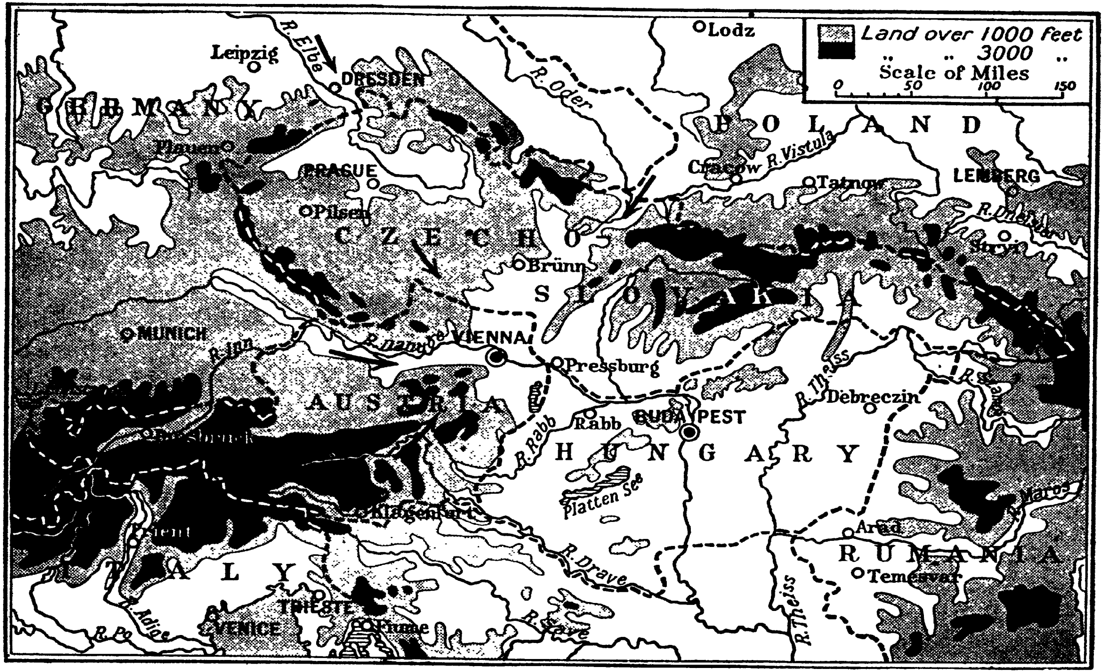

FIG. 76.—The New States of Austria, Hungary and Czecho-Slovakia.

including Moravia, (ii) The Eastern Alps, (iii) The Hungarian Plains, (iv) The Carpathians and Transylvania, (v) The Rumanian Plains.

(1) THE BOHEMIAN PLATEAU.

This diamond-shaped plateau is really a basin bordered by highlands (see Fig. 71). It is tilted north-westwards, so that it is drained by the head-streams of the Elbe, which leaves the country by the famous Elbe Gate. This fact, together with the nature of the country between Bohemia and Trieste, the port on the Adriatic, causes Bohemia to import and export through North Sea ports.

The climate, which is typical of Central Europe, is very favourable to agriculture, and when we recall that the Bohemian people are mainly Slavs who are industrious agriculturists, we shall be prepared for the statement that half of the country is tilled. The richest agricultural lands are found in the river valleys and in the northern lowland, where there are considerable areas of rich alluvial, and in some places of volcanic, soil. The chief crops are oats, wheat, barley, beet and hops; but the summers are sufficiently warm for vines and maize to ripen. In the south the land is rather infertile, and is largely devoted to rye—the chief Bohemian grain crop, potatoes—the staple food of the inhabitants—and to pasture.

All the highlands are forested, and provide not only large quantities of timber, but also pulp for the paper-mills of Pilsen and Prague.

Bohemia is exceedingly rich in minerals, so that it has become one of the chief industrial regions of Central Europe. Coal and iron are mined near *Pilsen* and *Prague,* and are largely used in manufactures based upon the products of the surrounding areas. Thus, both are engaged in brewing (barley and hops), paper-making (pulp), leather-manufacturing (hides from southern pastoral lands), sugar-refining (beet), as well as engineering, and particularly in the making of agricultural implements. Valuable beds of lignite occur in the north-west, and have aided the growth of many industries, the best known of which is perhaps the porcelain industry of *Karlsbad.* This is dependent upon the kaolin derived from the granitic rocks found in that district. Karlsbad and Marienbad are noted for their mineral springs. Coal, found in the north-west, as well as power from mountain streams, is used at *Reichenberg* and other towns at the foot of the Riesen Gebirge (= Giant Mountains) for the manufacture of cotton and woollen goods.

Prague or *Praha* is the chief city. It stands at the head of the navigation of the Moldau, and therefore of the Elbe, in a fine central position upon which the chief routes of the country converge. It is by far the largest city in the country, its population being nearly three-quarters of a million. Nearly two-thirds of the people of Bohemia are Czechs. Most of the German inhabitants live around the fringes of the " diamond."

Moravia is a smaller counterpart of Bohemia, but its slope is towards the Danube, to which it is drained by the March. The climate and agricultural products resemble those of Bohemia. Moravia is also an industrial region. The chief coalfield lies in the north-east, where a portion of the Silesian coalfield (see p. 337) extends into Moravia. Many towns are engaged in cotton, wool and iron manufacturing. *Brünn,* the capital, occupies a central position, and is engaged in all these industries. Moravia occupies a very important position near the *Moravian Gate,* the great lowland highway between the Sudetes and the Carpathians. A canal joining the Oder to the March, and hence the Baltic and Black Seas, passes through this famous gateway.

(2) THE EASTERN ALPS.

The Alpine provinces resemble Switzerland. They are Voralberg, Tirol, Salzburg, Styria, Carinthia, and part of Carniola. The physical map shows that towards the east the Alps decrease in elevation. The valleys open northwards (*e.g.* the Inn), eastwards (*e.g.* Drave and Save valleys) and southwards (*e.g.* the Adige). The Drave and other valleys opening eastwards to the plain of Hungary have the cold winters experienced on that plain; those opening to the plains of northern Italy enjoy the warmer Italian winters; whilst those opening northwards have a winter climate which may be classified as intermediate between the two. All have very warm summers. The lower altitude of the eastern Alps has the effect of making them more productive than the western Alps, whilst the climatic differences just noted between the different sets of valleys affect the type of crop produced in each. The southern valleys are warm enough for the vine and the mulberry, whilst the eastern and northern valleys are more suited for cereals. The richest Alpine provinces are naturally those of the lower foreland, *i.e.* upper and lower Austria, and eastern Styria and Carniola. In the higher provinces agriculture is practically restricted to the valleys. As in Switzerland the high pastures are important for summer dairy-farming. The mountain forests form a great source of wealth, and large quantities of timber are floated down the east-flowing rivers to the treeless plains. In some parts minerals are abundant, and their presence has led to the growth of mining and manufacturing industries at *Eisenerz* and other places in Styria, where lignite is found and iron is mined and smelted; at *Bleiburg* and other towns in Carinthia, where lead works using the local supplies of lead are found; at *Salzburg,* where salt and copper are mined; and at *Idria* in Carniola, where there are deposits of mercury. *Klagenfurt,* in eastern Carinthia, and

Graz, in eastern Styria, are very important iron-smelting and manufacturing towns. In Voralberg, the province adjoining Switzerland, the abundance of water power and the influence of the Swiss example have led to the rise of cotton manufacturing, whilst in Tirol the manufacture of silk is carried on.

(3) THE HUNGARIAN PLAINS.[1]

The plains of Hungary are divided into two unequal portions by the Bakony Wald, at whose foot lies the shallow Balaton or Platten Lake, and an extension of the Carpathians (the Tatra and the Hungarian Ore Mountains), both of which come to the Danube at its great bend. To the north-west lies the Little Plain, to the south-east lies the Great Plain, frequently called the *Pusztas*. The climate is extreme and the rainfall light, so that the natural vegetation is steppe. Formerly pastoral occupations formed the chief pursuits of the Magyar, a steppe land invader, who found himself at home in such a land and spread out throughout its length and breadth, but avoided the highlands. At the present time half of the plains have been ploughed and produce enormous crops of cereals, particularly maize, grown largely for feeding stock, and wheat, so that the region is one of Europe's richest granaries. The vine is widely grown, especially on volcanic soils in the vicinity of *Tokay*, on the upper Theiss, one of the most meandering rivers in the world. Tobacco and beet are also grown. In the Banat, the south-eastern part of the Great Plain, the summers are hot enough for the production of rice. As in Argentina and in Canada the development of agriculture has been stimulated by the construction of a network of railways radiating from Buda-Pest, the Hungarian capital.

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[1] It must be noted that the limits of what we here call the Hungarian Plains do not coincide with the frontier of the new Hungary.

Pastoral occupations and dairy-farming are of great importance and find occupation for large numbers of people. Millions of cattle, horses, sheep and pigs are reared, as well as considerable numbers of goats. *Debreczin,* south of Tokay, is a great horse market.

Manufacturing is little developed except in connection with agriculture, *e.g.* flour-milling, sugar-refining, tobacco-manufacturing and brewing. *Buda-Pest* is an important milling centre.

(4) THE CARPATHIANS AND TRANSYLVANIA.

The folded ranges of the Carpathians extend from the Little Carpathians, which reach the Danube east of Vienna, to the gorges of the Iron Gates, where the Danube leaves Hungary. The system is continued by the Balkans. Transylvania is a plateau shut in by the great bend of the Carpathians on the east and the Bihar Mountains on the west.

The Carpathian ridges are largely composed of sandstone, except in the western extension formed by the Tatra and the Hungarian Ore Mountains, where granite and other older rocks are found. The Bihar Mountains on the western border of Transylvania are also granitic. Both the Carpathians and Transylvania (= beyond the Forest) are forested, and as forestry occupations are scientifically controlled, large quantities of timber are obtained not only for use on the treeless plains, but also for export. Minerals are fairly abundant. Iron and some gold are mined in the Tatra and Hungarian Ore Mountains, whilst iron, gold, silver and lead are found in the western part of the Transylvanian Alps. It is interesting to notice that in Transylvania we have an epitome of the whole region, for it has representatives of at least five different nations speaking different languages and belonging to different Churches, and of these the majority are not Magyars, although the area was formerly in Hungary, but Rumanians, of whom there are about 3,000,000. The inhabitants of Transylvania are chiefly engaged in pastoral and agricultural pursuits.

(5) THE RUMANIAN PLAINS.

The Rumanian plains of Wallachia, Moldavia and Bessarabia are really a tongue of the Russian plain. They are rich agricultural lands yielding valuable crops of wheat and maize as well as vines and tobacco. The maize is extensively used for fattening cattle and pigs,

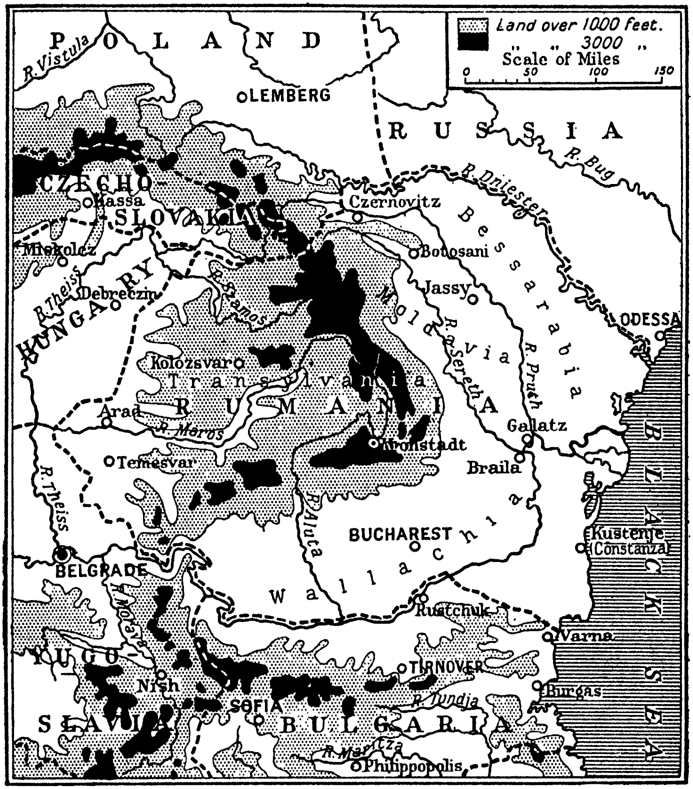

FIG. 77.—The New Rumania.

for pastoral occupations are very important too. The drainage of the swamp bordering the left bank of the Danube will give much land suitable for dairy-farming.

Along the foothills of the forest-clad Carpathians, especially in the Prahova district north-west of Bucharest, are very rich deposits of salt and petroleum. The Carpathian forests of fir, oak and beech not only support large numbers of pigs, but also supply timber to the treeless plains. The Dobrudja area, which lies south of the Danube delta, is so dry that it is practically semi-desert.

CHIEF ROUTES.

The river Danube is the great water highway of south central Europe. It rises in the Black Forest, and has the upper part of its course across the Alpine foreland, where it receives from the Alps the Isar, on whose banks Munich stands, and the Inn, whose valley gives the very important route to the Plain of Lombardy via the Brenner Pass. After passing through the *Austrian Gate,* the gap between the Bohmer Wald and the Alps, the river enters upon the plain of Vienna, where it receives the March, whose valley leads to the *Moravian Gate.* At Pressburg (Bratislava) it passes through the *Carpathian Gate,* where the Alps and the Little Carpathians come close together, and enters the Little Hungarian plain. In this plain the river divides into three channels, which unite before the *Hungarian Gate,* between the Bakony Wald and the Tatra, is reached. Leaving the Hungarian Gate the river turns abruptly southwards, and after passing Buda-Pest meanders across a great flood plain. It is first turned eastwards by the Drave, then southwards by the Theiss and finally eastwards once more by the Save. The Drave and the Save, if not of great value for their navigability, are of considerable value for their flotability, for vast quantities of Alpine timber are floated along them to the treeless plains. The Theiss, or Tisza, has most remarkable meanderings. Some parts have been canalized, whilst in other parts canals have been made to shorten the tiresome journey along the bewildering windings, so that the river is now navigable for the greater part of its course. Soon after Belgrade is passed, the Morava, whose valley is followed by the Orient Express route, joins the main stream from the right bank. The Danube leaves the Hungarian Plain by one more gorge, at the eastern end of which are the famous rapids of the *Iron Gates*, now rendered navigable. After passing Orsova, at the Iron Gates, the river flows along the northern margin of the Balkan foreland, which gives a high south bank in marked contrast to the low-lying swampy plains along the left bank. Finally it reaches the Black Sea by an extensive delta.

The navigation of the Danube is now open to ships of all nations. Unfortunately, the fact that it flows into an almost enclosed sea lessens the international value of the route.

Bohemia, the chief industrial region of this part of Central Europe, is both by rail and river in closer touch with Hamburg, Bremen and Stettin than with Trieste. It is because of this that the navigation of the Elbe and the Oder have been made free to all nations (see Fig. 75). The trade of Trieste and Fiume is principally with the eastern Mediterranean and the Far East.

Projects have been considered for connecting the Danube to the Elbe, the Oder and the Vistula. Such a series of canals would be of very considerable importance.

The great railway routes converge, in a very striking manner, upon Vienna and Buda-Pest (see Fig. 76). *Vienna* commands the Austrian Gate and has been aptly named the "Key to the Danube." It stands where the Danube leaves the highlands for the plains and may be compared with Cologne, which occupies a similar position on the Rhine. It has also the advantage of having a site upon which converge several routes of first-class importance. These are:

(i) From Bavaria via the Danube and the Austrian Gate; (ii) from Berlin via Dresden, the Elbe Gate and Bohemia; (iii) from Silesia, Poland, Galicia and beyond, via the Moravian Gate and the valley of the March; (iv) from Buda-Pest and beyond via the Hungarian and Carpathian Gates, and (v) from Venice and Trieste via the difficult route across the valleys of the Save and Drave and the Semmering Pass. The city grew up around a Roman camp which was naturally on the right bank of the river, since the river was the frontier. In pre-war days Vienna was a great manufacturing city, especially noted for furniture, metal goods and leather goods. In the manufacture of *objets de luxe* it rivalled Paris (see also pp. 360-1).

The Orient Express route from Paris to Constantinople follows the Danube as far as Buda-Pest. Then it cuts more directly across the plains to Belgrade, the Serbian capital, which stands at the confluence of the Save and the Danube. *Buda-Pest* is the centre of a great network of lines radiating in all directions. The chief are: (i) To Fiume, the Adriatic port, (ii) to Ragusa via Bosnia and Herzegovina, (iii) to Belgrade and the Moravian valley, (iv) to the Iron Gates and the lower Danube, and (v) the more difficult lines which cross the Carpathians and reach Cracow, Lemberg and Bucharest. In the Carpathians the passes crossed by railways are further apart than in the Alps. This is not because they are more difficult to cross, but because they separate plains of similar products, whilst the wide mountain belt itself in most parts yields little besides timber. The Magyar Gate, the pass to which the headstreams of the Theiss and the Pruth lead, is also crossed by railway. In Galicia there is a double system of railways running parallel to the direction of the mountains. The more important one is that connecting Cracow, Lemberg and Czernowitz and forming a part of the great Hamburg–Odessa route. The other line runs close to the base of the mountains.

The east and west valleys of the Alpine region give splendid routes. The most important railway leaves the Vienna-Trieste line at Bruck and utilizing the valleys of the Ems, the Salzach and the Inn, it reaches Switzerland by means of the long Arlberg tunnel. *Innsbruck,* which is on this route, also commands the more famous Munich–Brenner Pass–Verona north and south route from Germany to the plain of Lombardy.

THE NEW DANUBIAN COUNTRIES.

The political map of this part of Central Europe is very different from what it was in 1914. The new units correspond more closely to the distribution of the peoples of the several nationalities, although in every case there are minorities of other nationalities. This is inevitable owing to the complex way in which the peoples are distributed.

The Czecho-Slovak Republic (area 55,000 square miles, population 15 millions).—This new enterprising country includes Bohemia, Moravia, Slovakia and part of Silesia. These lands are all inhabited chiefly by Slavs, and were formerly part of Austria-Hungary. The Czechs of Bohemia and Moravia, lands which we have already seen (see pp. 351-2) contain rich industrial and mining districts, are more advanced than their Slovak kinsmen, who are chiefly agriculturists. The mountains of Slovakia (the "Hungarian" ore mountains), however, contain important deposits of iron, copper and zinc, as well as supplies of lignite and a little coal. The development of these resources will cause many changes. Even now iron and iron goods are the chief exports.

The new state has no coastline and therefore no seaport, but she can use the Elbe, the Oder and the Danube, all of which have been internationalized, whilst she may send trains over the Austrian railways to Adriatic ports. The capital, Prague (Praha), is destined to become one of the chief cities of Central Europe.

The Austrian Republic (area 32,400 square miles, population about 6¾ millions).—This small inland country corresponds, roughly, with Austria proper of the old regime. It includes Upper and Lower Austria, which lie along the Danube, and portions of the eastern Alps. The capital is *Vienna,* a city of nearly two million people, and altogether too large for the new Austria to support, a fact which is having tragic consequences for its inhabitants. The city has a magnificent situation, which may be compared with that of Cologne, since it is situated where the Danube leaves the highlands for the plains, at a point upon which some of the chief routes of Central Europe converge (see Fig. 76). It has important furniture, metal and leather industries.

Most of the inhabitants of the new Austria are Germans.

Hungary (area 36,000 square miles, population nearly 9 millions).—The new Hungary is chiefly the middle plain of the Danube, which gathers round Buda-Pest. The lands which have been retained are practically those in which Magyars form the bulk of the people. Hungary is thus, on the whole, a rich pastoral and agricultural country. Both Austria and Hungary are now entirely inland states, but the peace treaties give to both the right of freedom of access to the Adriatic ports of the former Austro-Hungarian Empire. The capital is *Buda-Pest* (see pp. 354-5 and Fig. 84). From 1918 to 1920 Hungary was a republic, but in the latter year a new parliament decided to reinstate the old monarchical institutions. Hungary is now a monarchy with a vacant throne, the functions of the monarch being exercised by a Regent until the country regains settled conditions, when the dynastic question will be solved.

Rumania (area about 122,000 square miles, population about 18 millions).—This country is now twice its prewar size. It has received Transylvania, Bukowina, Bessarabia and half of the Banat. These territories, together with old Rumania (chiefly the Wallachian and Moldavian plains), make up a country of rich and varied natural resources, in which corn, minerals, oil and timber predominate.

If the new country can be consolidated it will undoubtedly become one of the chief powers of Central Europe. It contains minorities of many nationalities (Jews, Germans, Magyars, etc.), all of whom are specially protected by treaty.

Bucharest, the capital, has a central position in the Wallachian plain. This gives it a good site for the command of routes from the Banat via the Iron Gate, from Transylvania via the Carpathian passes, from southern Russia and from the port of Constanza. *Galatz* and *Braila* are important river ports at the head of the Danube delta.

EXERCISES.

1. Draw a map of the Basin of the Danube. Indicate the countries or states which it drains. Shade the highlands which come within the basin. Indicate the chief means of communication both within the basin itself and between the basin and outside areas. Add a short account of the seasonal supply of water to the different parts of the main stream or its tributaries.
2. Compare the Hungarian Plain with the North German Plain.
3. On page 359 the routes converging upon Vienna and Buda-Pest are given in detail. Draw sketch maps, after the model of Fig. 82, to illustrate the routes commanded by these cities.
4. Comment on the political frontiers of the new Danubian countries. What elements make (*a*) for the development of strong new countries? (*b*) for possible trouble in the future?
5. What is the population of Austria? What are the natural resources of the country? What is the population of Vienna? Why is the city so large? Do you think it can be supported by the present Austria?
6. Draw sketch maps (see Fig. 82) to illustrate the sites of Prague, Bucharest, and Brünn.
7. Write a connected geographical account of each of the following new states: Rumania, Hungary, Czecho-Slovakia.
8. "The Austro-Hungarian provinces which now constitute Czecho-Slovakia, produced 83% of the coal, 90% of the sugar, 85% of the hemp, and 97% of the flax produced in the whole of the Austro-Hungarian Empire. Indeed, the new country found itself in possession of 80% of the whole industry of the former Empire" (*Survey of Overseas Markets:* H.M. Stationery Office). Comment on this statement.

CHAPTER XXXIV.

SWITZERLAND.

PHYSICAL FEATURES.

SWITZERLAND is the most mountainous country in Europe. It has an area of 16,000 square miles (= half Ireland), and a population of about 4,000,000 (= about a quarter of a million less than Ireland). It forms an admirable buffer state.

A study of a physical map will show that Switzerland readily falls into three physical regions: (i) The Juras, (ii) the Alps, and (iii) the Central Plateau.

(i) *The Juras.*—We have already learned that these mountains, which lie on the Franco-Swiss frontier, are a series of parallel folds of limestone, whose tops have been flattened by denudation. The troughs between the upfolds form longitudinal valleys in which communication is easy in the direction of the main axis, *i.e.* from north-east to south-west, but difficult at right angles to the valleys, *i.e.* from north-west to south-east. Being composed of limestone, many parts of the Juras exhibit karst characteristics, with which we are already familiar. In other parts they are forested, whilst in others cultivation extends to the summits. The limestone of which these highlands are composed is similar to that of the oolitic scarpland of south-eastern England, and is usually known as Jurassic limestone.

(ii) *The Alps.*—These mountains are great folds of the earth's crust, probably caused by thrusts from the south-east which caused the rocks to buckle, crumple, or fold, and since the ancient plateau core of central France on the

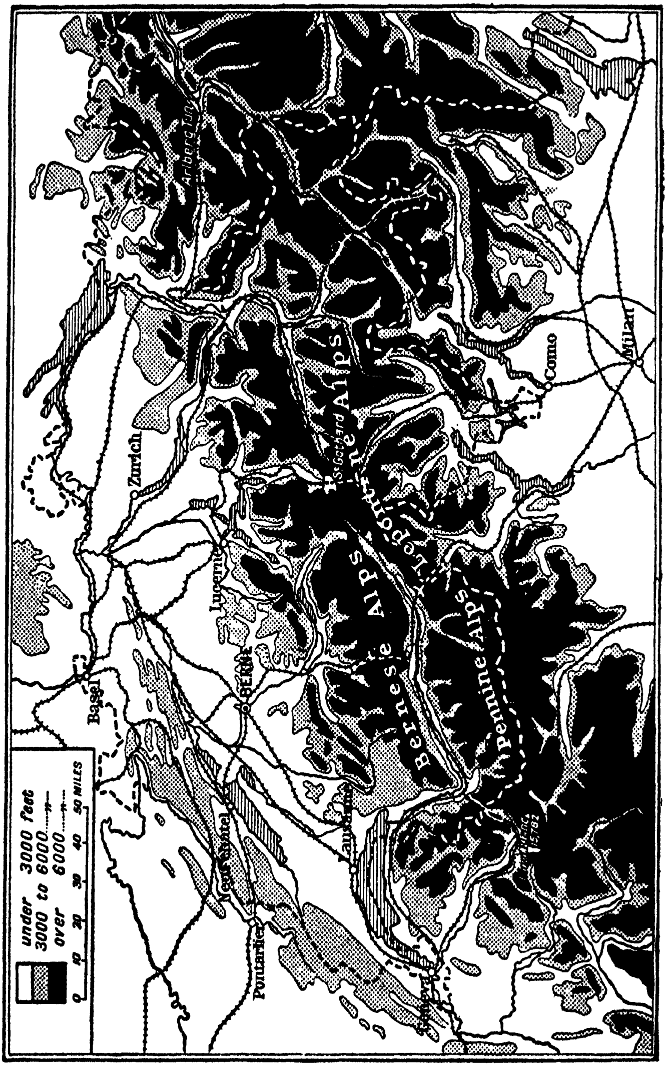

FIG. 78.—Switzerland. Relief and Routes.

west, and of similar areas to the north acted as centres of resistance, the folds were compelled to assume their graceful sweep from Genoa to Vienna. The highest central ridges are composed of old, hard, crystalline rocks, *e.g.* granite, which make imposing ridges and peaks; but younger sedimentary rocks, *e.g.* limestone, appear on the flanks of the older rocks. It is worthy of note that where the Alps are highest, *i.e.* in the region of Mont Blanc, they are narrowest, whilst towards the east where they are widest they are also lowest. The longitudinal valleys of the upper Rhone and the upper Rhine form a marked trench which is of great importance in connection with communications (see Fig. 78). The mountain mass of St. Gothard forms the watershed between the two rivers. Mont St. Gothard is a very convenient starting-point for a consideration of the main ridges and valleys of the Central Alps. Besides the upper Rhine and Rhone valleys, which lead north-east and south-west respectively, two other valleys open out from the St. Gothard mass. They are the valleys of the Reuss and the Ticino, which lead northwards and southwards respectively, and between whose sources lies the famous St. Gothard Pass. The tunnel enables railways to avail themselves of this great north and south route, the most important of all the Alpine routes. North of the upper Rhone is the Bernese Oberland (= over or upper land), in which, near the Jungfrau, a peak of striking beauty, and Finsteraarhorn, lies the famous Aletsch glacier. South of the Rhone are the Lepontine and Pennine Alps. The latter contain about thirty peaks exceeding 2½ miles in elevation. Some of the most famous are Mont Blanc—the highest in the Alps—Monte Rosa, and the Matterhorn, whose sides are so steep that snow cannot accumulate upon them. East of St. Gothard there are also giant ridges, north (Glarus Alps) and south (Adula and Rhætian Alps) of the upper Rhine.

Most of the Alpine lakes are located where the valleys open from the mountains. Thus along the northern margins are Zug, Lucerne and Thun, and in a similar position in the south, Maggiore, Lugano, Como and Garda. All these lakes are long and narrow and fill moraine dammed valleys, which formerly contained glaciers.

(iii) *The Central Plateau.*—On their southern margins the Alps rise abruptly from the plain of Lombardy, but to the north they give way to a plateau foreland stretching from south-west to north-east. This plateau, whose altitude varies from 1,000 to 3,000 feet, is largely composed of sandstone and is not very fertile, except where there are glacial or loess deposits. On the plateau are the large lakes, Neuchâtel, Geneva, Zürich and Constance. The first lies at the base of the Juras, the others are drained by Alpine rivers but are situated outside the lower mountain valleys of their respective streams. The general slope of the plateau is indicated by the direction taken by the rivers (Aar, Reuss, etc.), which flow north-westwards to the base of the Juras, where they unite to form the Aar. One of the feeders of this river drains Lake Neuchâtel.

CLIMATE.

In a mountainous country like Switzerland changes of climate are largely due to differences in elevation. It will be recalled that for every 300 feet of ascent the temperature falls about 1° F., so that in a country whose altitude varies from about 600 feet in some of the southern valleys to over 15,000 feet in the highest peaks, and whose average elevation is about the height of the top of Snowdon, this factor will be very important. But other factors modify the influence of elevation. For example, the slope of the land to or from the sun, especially in the valleys, is often sufficient to have an effect equal to that of many degrees of latitude. Again, the presence of large lakes affects their immediate neighbourhood very considerably, whilst valleys show appreciable differences according to the direction in which they open: *e.g.* valleys opening southwards are much warmer than those opening eastwards or northwards. The occasional hot fōhn winds should also be noted. They are most commonly experienced in those valleys which open to the north.

As regards rainfall, too, the chief factor is elevation, but it must be remembered that beyond a certain altitude (about 6,500 feet in the Alps) the amount of the fall decreases owing to the exhaustion of the water vapour of the atmosphere. The position of the snow-line depends upon altitude, the summer temperature, and the amount of rainfall. It is lower on the northern than on the southern slopes, and on both slopes is lower in the wetter west than in the drier east, whilst some of the valleys are so sheltered that cultivation depends upon irrigation. The plateau, owing to its more uniform elevation, has an evenly distributed rainfall, although there is a distinct rain shadow to the lee of the Jura Mountains.

CHIEF INDUSTRIES.

Twenty-two per cent. of the total area is unproductive, 27 per cent. is under grass and meadows, 25 per cent. is forested, 15 per cent. is devoted to fruit-growing and 1.1 per cent. is under crops and gardens. Stated broadly, one-quarter of the land of Switzerland is waste-land, one-quarter is forested, one-quarter is pasture-land, and one-quarter is devoted to agriculture. The unproductive lands are chiefly found in the high mountains, where neither climate nor soil is favourable, but, considering the height of much of Switzerland, the proportion is relatively small.

Pastoral Occupations.—There are about 1,700,000 cattle in the country as well as large numbers of pigs and goats. Sheep-rearing is not very important. Cattle are chiefly reared on the pastures of the Alpine foreland, but they are also found in the Alpine section. There, they spend the winter in the valleys, but in spring they are driven to the high mountain pastures—the alp—where they stay until the end of summer. The exact time at which they can leave the valleys for the mountain pastures largely depends upon the föhn, which in a few hours will clear away more snow than many days of bright sunshine.

Much more milk is produced than is necessary to supply the needs of the inhabitants, so that the surplus is manufactured into cheese (*e.g.* the noted Gruyère), into milk chocolate, or is condensed. These articles form very important exports. In addition, the manufacture of leather, and particularly of kid and morocco leather from goat-skins, is another example of a manufacturing industry related to the keeping of animals.

Agriculture.—The cultivated areas are mainly in the Alpine foreland or in the valleys. Their location in the former region is dependent upon the presence of fertile glacial soils and alluvium. Rye, oats, wheat and potatoes are the chief crops; but in the sheltered valleys the vine can be cultivated, *e.g.* on the sunny, south-eastern slopes of the Jura, whilst in the warmer southern valleys, *e.g.* the valley of the Ticino, the cultivation of maize, mulberries, and even of olives betokens the approach to the Mediterranean region. Switzerland does not grow enough agricultural produce to support her population and her numerous visitors, and she has, therefore, to import large quantities of cereals and other foodstuffs.

Forestry.—The Swiss forests are under Government supervision, and great care is taken that the area of forest is not diminished. On the Alpine foreland beeches predominate; in the forests which clothe the lower and middle slopes of the Alps, conifers form the chief trees; but in the southern valleys, oaks and chestnuts are most common.

Manufactures.—Although the occupations already mentioned employ a majority of the people, Switzerland is a very important manufacturing country. This is seen in the trade statistics, which indicate that the chief imports are foodstuffs and raw materials for manufacture, whilst the leading exports are manufactured goods. It is remarkable that, although situated in the heart of Europe with no outlet to the sea. having to receive her imports from abroad through the ports of other countries, and having very little mineral wealth, especially of coal and iron, the manufactured products of Switzerland are found in every country of the world. Most of the manufactures began as home industries, which have been developed, partly by the presence of great reserves of water power, which make electricity the cheapest motive and lighting power in the country, and partly by the efficient technical education which has increased the skill of the people themselves. As both coal and raw materials have to be imported, it follows that the Swiss, like the people of the New England States in North America, adapt their work to the production of those articles which require the application of a great deal of skill to a small amount of raw material—*e.g.* watches, clocks and musical-boxes.

Watches and clocks are chiefly made in towns lying along the base of the Juras, *e.g.* Geneva, Chaux-de-Fonds and Neuchâtel. *Cotton goods,* especially embroidery, and *silk goods* are largely manufactured in the towns lying along the northern base of the Alps, *e.g.* Zürich, Berne and St. Gallen, but also at Basel. *Zürich,* the largest town in Switzerland, is the chief manufacturing centre.

"The Playground of Europe."—The natural beauties of Switzerland are so great that every year thousands of tourists from all parts of Europe, and even from farther afield, visit the country. This has led to the establishment of numerous hotels for the accommodation of the visitors, and to the employment of thousands of men and women as hotel-keepers, waiters, servants, etc. Any consideration of the chief industries of Switzerland would, therefore, be incomplete without some reference to those who find employment in hotels, on carriages, railways, or lake steamboats, or as guides. It has been very truly said that the magnificent scenery of the Alps is a commercial asset which yields a very profitable return.

COMMUNICATIONS.

Under this heading one of the most interesting points is the central position of Switzerland. This, together with the fact that it is in close contact with three of the chief European States (France, Germany and Italy), has led to the country becoming an important international clearing-house. Thus, the headquarters of the International Labour Bureau, the International Railway Administration, the International Postal Union and the United Telegraph Administration, the great clearing-house of the Geneva Red Cross Society, and last, but chief in importance, the Headquarters of the League of Nations, are all situated there.

Of the internal communications the 1,800 miles of state-owned railways are of chief importance. There are also many light railways, by means of which steep mountain slopes, such as those of the Rigi and Pilatus, both near Lucerne, can be overcome with ease by those who do not desire to go on foot. Such railways are usually worked by cog-wheel attachments. In those mountain districts not reached by railways the usual method of communication is by *diligences,* which are coaches drawn by horses. These carry luggage, passengers and mails over high passes and along mountain roads so long as the passes and roads are not snow-covered and remain open to traffic.

Switzerland lies between south Germany on the one hand and Italy and the Mediterranean ports on the other, so that the north and south routes have to surmount the Alpine barrier, which runs roughly at right angles to the direction of the routes. But the Alps are notched by deeply cut cols and passes, and since the upper valleys of rivers usually lead to these, the real difficulty normally consists of cutting a tunnel below the level of the pass itself. The chief route between western Germany and the Mediterranean enters Switzerland at Basel. It then crosses the Alpine foreland to Lucerne, afterwards passing along the upper valley of the Reuss to Göschenen.

From this town to Airolo on the southern side of the mountain mass, the railway passes through a tunnel, whose length is nearly 10 miles and whose height above sea-level is a little less than 3,800 feet. The road, the first to cross the Alps, follows the pass and picks up the railway once more at Airolo. From this town the valley of the Ticino gives the means of making the descent on the southern side, and of finally reaching Milan via the lakes of Lugano and Como.

Several railways from France (the chief is the Paris–Dijon–Pontarlier line) cross the Juras and converge upon Berne, the Swiss capital, which stands on the Aar in a very central position for communications with all parts of the plateau. From Berne another Trans-Alpine railway reaches Milan and the Mediterranean, and is a great rival of the Gothard route. The new Lötschberg Tunnel through the Bernese Oberland enables the line to reach Brieg, on the upper Rhone, whilst the Simplon Tunnel (12¼ miles long) gives access to the valley of the Toce, which leads the route along the shores of Lake Maggiore to Milan. A very important connection of the Simplon route is that which enters Switzerland from France at Geneva, and reaches Brieg via the valley of the Rhone (see Fig. 78).

The chief east and west connections are those which effect communication between the railways of the plateau, where lines run in all directions, and the Austrian lines converging upon Innsbruck. Two routes converge upon the Arlberg Tunnel from the west: the first from Basel, via the valley of the Rhine and the shores of Lake Constance; the second from Zürich via the shores of Lakes Zürich and Wallenstadt and the upper Rhine.

The raw cotton for the mills of Zürich, St. Gallen, etc., and the imports of cereals, metals and coal are largely introduced via the great, free waterway of the Rhine. At present Mannheim is the chief river port and distributing centre for these products; but improvements are being made in the navigation of the Rhine, which may lead to goods reaching Basel before being placed on railways. It is anticipated with some confidence that eventually the Rhine may be navigable as far as Lake Constance. Italian raw silk reaches the manufacturing towns via the Alpine tunnels, as also do imports of that article from China and Japan, as well as other products of the East. The watchmaking towns of the Juras do most of their export trade through Havre and other French ports.

THE PEOPLE.

The mountainous nature of the country has greatly aided the Swiss in the fight for the preservation of their independence. It has also been responsible for the preservation of links with the past. Thus, in some of the less accessible districts, *e.g.* in the canton of Graubünden, which includes the upper feeders of the Rhine, there are some 40,000 people who speak Roumansch, a distinct Latin dialect (see p. 286). The people are largely of the Alpine race, but other races are also found, for on the fall of the Roman Empire, the north was over-run by northern men belonging to German tribes, whilst in the south Italians have pressed along the river valleys, *e.g.* the Ticino, even as far as the watershed. There is no Swiss language. About two-thirds of the 4 million inhabitants speak German, the majority of the remainder speak French, and only about one-sixteenth Italian. The German-speaking inhabitants naturally live in the north, the French-speaking ones in the west, and the Italian-speaking people in the south. The proportion of each is an indication of the distribution of the population, for the majority of the people live in the central plateau, especially in the manufacturing region extending from Berne to Lake Constance. Only four towns have more than 100,000 inhabitants, Zürich (250,000), Basel (148,000), Geneva (143,000), and Berne (112,000). In the Alpine region the largest centres can only be described as large villages which are chiefly dependent upon the tourist trade.

The Swiss enjoy complete freedom in religious matters. About 57% are Protestants and 41% Catholics. The Protestants are in the majority in the Jura and the plateau cantons, the Catholics in the Alpine provinces. Despite the differences of language, race and creed, the Swiss are very homogeneous, and there is little or no antagonism between the different people. The fact that several languages are spoken is of distinct commercial value, for as most of the people speak two and many three languages, the Swiss commercial traveller begins with a definite advantage over his rival.

EXERCISES.

1. Why is Switzerland called the "Playground of Europe"? Why do Swiss guide-books frequently give places as being so many hours apart from each other instead of so many miles?

2. Give the exact location of the St. Gothard Pass. What is meant by a pass? Why do railways tunnel below the pass and roads go over it? How far is it correct to call the St. Gothard Pass the "Key to Switzerland"?

3. Compare the positions of Lakes Geneva and Constance. What rivers flow through them? How do the lakes affect the rivers? How do the rivers affect the lakes?

4. Discuss fully the advantages and disadvantages possessed by Switzerland for her modern rise as a manufacturing country. Is Switzerland more or less fortunate in this respect than Norway?

5. Give details of the way in which the action of frost, ice and running water have affected Swiss scenery.

CHAPTER XXXV.

THE MEDITERRANEAN REGION.

PHYSICAL FEATURES.

THE Mediterranean Sea, the largest inland sea in the world, is almost land-locked. From the narrow Strait of Gibraltar where it communicates with the Atlantic Ocean, to the Syrian coast is about 2,200 miles. In the north-east it communicates through the Dardanelles, the Sea of Marmora and the Bosphorus with the Black Sea. Some broad contrasts with the Baltic may here be noted. The Mediterranean is much larger than the Baltic and lies in warmer latitudes. It has high coastal margins, particularly in the north, where an almost continuous mountain wall protects it from the cold north winds, whilst the Baltic shorelands are plains which expose that sea to cold winter winds. The Mediterranean is exceedingly deep, whilst the Baltic is shallow. Far more evaporation takes place in the Mediterranean area than in the Baltic area, and this coupled with the fact that the latter receives more fresh water from its rivers than is lost by evaporation, while the opposite is the case in the Mediterranean, not only makes the Baltic waters very fresh and those of the Mediterranean above the normal in salinity, but sets up surface currents flowing *out* of the Baltic and *into* the Mediterranean. The higher latitudes and the lower salinity of the Baltic also cause that sea to freeze very readily in winter. Both seas have small tides owing to their narrow entrances. In the open Mediterranean the rise and fall is often less than one foot, but at Venice, at the head of the Adriatic, it reaches about three feet. These conditions are very suitable for the formation of deltas, which are found at the mouths of all the chief Mediterranean rivers. Since harbours built upon deltas readily become silted, Mediterranean ports are not placed at the mouths of rivers, but a little to one side. Thus Marseilles stands east of the Rhone delta, Tarragona north of the Ebro delta, and Salonika east of the Vardar delta. Mediterranean ports have the great advantage of being accessible at all times, whereas the great ports of Western Europe, which are usually found at the head of estuaries, *cf.* Hamburg, Bremen and London, are only accessible for large ships at the time of the high tide.

The Mediterranean is naturally divided into two very different basins, an eastern and a western, separated from each other by the long bridge of the Italian peninsula and its submerged continuation, above which rises the island of Sicily (see Fig. 79).

THE WESTERN BASIN.

The western basin of the Mediterranean is surrounded by an almost unbroken wall of mountains. It is, therefore, important to notice the breaks, or gaps, since they will be the great gateways to the basin. In the west there is the Strait of Gibraltar, only nine miles wide, commanded by the great British rock fortress of Gibraltar, the "Key to the Mediterranean." Two other sea gateways are on either side of Sicily, the broad Strait of Sicily to the south, and the narrow Strait of Messina to the north. The command of these straits, which give communication between the two Mediterranean basins, has always given the island of Sicily great strategic importance. The positions of the ancient city of Carthage, near Tunis, of the modern French naval station of Bizerta, and of the fortified British island of Malta, all emphasize the importance of these gateways. Only two lowland gateways break the mountain wall, and both of these are in the south of France, the Gap of Carcassonne, between the central plateau and the Pyrenees, and the narrow Rhone valley, between the central plateau and the Alps. These two gateways leading from the Mediterranean to northern France have profoundly affected not only France but the whole of Western Europe.

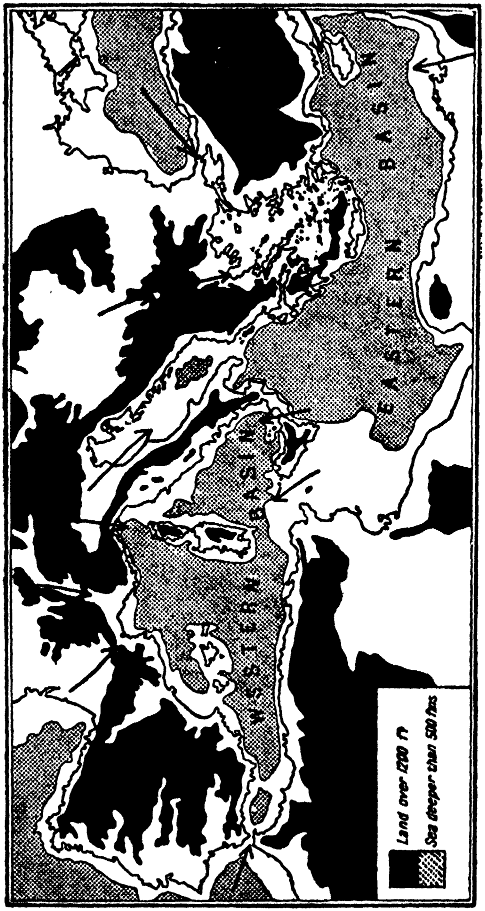

FIG. 79.—The Mediterranean Lands.

Formerly the Pyrenees were joined to the Alps, but very fortunately a large block of mountains has suffered subsidence, and thus these two gateways were given immediate access to the Great Sea. The construction of Alpine tunnels connecting Central Europe with the plain of Lombardy and with the port of Genoa has given a sixth means of access to the western basin of the Mediterranean, but it is not a natural gateway like the others.

THE EASTERN BASIN.

The eastern is the larger of the two basins, and it lies further south. The mountain barrier is not continuous in the north, and in the south is practically absent. The most important gateway is that formed by the construction of the Suez Canal, which gives an eastern outlet via the Red Sea to the Indian Ocean and the Far East. This gateway, like the western gate at Gibraltar, is commanded by the British. Another historic gate is reached by following the Persian Gulf and the plains of Mesopotamia to Aleppo, which commands it. The Bosphorus, the Sea of Marmora and the Dardanelles form a gateway from the Black Sea. Salonika commands a fourth route which reaches the Ægean Sea via the Morava and the Vardar valleys, whilst at the head of the long and narrow Adriatic are Venice, Trieste and Fiume, the termini of railway routes, all of which must cross mountain barriers before reaching the sea. In addition to these the Straits of Sicily and Messina are sea gateways leading from the western basin. The eastern basin is of less importance than the western basin, owing to the character of lands which lie along its shores. To the east the low coastal plain and the "hill country of the shepherds," which lies between the coastal plains and the Jordan, soon give way to arid desert. To the south the Sahara everywhere reaches the sea, except in the peninsula of Barka and the Nile delta.

Climate and Products.

The lands bordering the Mediterranean have the Mediterranean type of climate, except where the Sahara reaches the sea along the southern margins of the eastern basin. The products are also "Mediterranean" in type. We have noted the chief physical differences between the Mediterranean and the Baltic. The difference between their climates is responsible for the differences between their products. "Mediterranean trade" is largely in wines, fruits and silks, "Baltic trade" is chiefly associated with cool temperate forest products (timber, pulp, resin, etc.), dairy produce, hemp, flax, etc.

The Mediterranean has several well-known variable winds which affect particular localities. Of these the following are the most important.

The Mistral (= Masterful Wind) is a cold north-west wind experienced in the lower basin of the Rhone and in the Riviera. The cold air over the Alps and central plateau of France gravitates to the coasts whenever the pressure there is low, and especially when cyclones pass along the northern Mediterranean. It is a very unpleasant wind, setting in quite suddenly and doing much injury to vegetation.

The Bora (= North Wind) is experienced at the head of the Adriatic Sea and along the Dalmatian coast. It blows in strong, repeated gusts, generally producing boisterous squalls frequently accompanied by snow. Like the Mistral, it is produced by the movement of air from cold highlands towards low-pressure areas over the warmer sea.

The Sirocco, experienced in Greece, Sicily and southern Italy, and the *Leveche,* of southern Spain, are totally different from the Mistral and the Bora. They are hot, dry, suffocating, dust-laden south winds from the Sahara. They do great damage to vineyards and olive gardens, and are almost as oppressive during the night as during the day. They are liable to blow at any season, but mostly occur during early spring. They are caused by the northerly movement of air towards low-pressure systems passing eastwards along the Mediterranean. *The Salano,* experienced in eastern Spain, is a cloud-bringing, moist, rain-bearing, east wind and should not be confused with the hot, dust-laden Leveche. It is a friend rather than an enemy.

Brief Historical Notes.

The Mediterranean region has had a remarkable history, especially with regard to the early civilizations which flourished along its shores (see p. 284). Egypt, of course, owed its importance to the Nile. Phœnicia grew up along the Syrian coast, where the great routes between Egypt and Babylon reached the sea, and its people were compelled to go upon the sea owing to the fact that their land was too poor to support them by agriculture alone. As Phœnicia grew in power, colonies were founded, of which Carthage, the most important, gave them the command of the straits between the two basins. From Carthage other colonies were planted. Later the Greeks entered the Balkans, and in a land with such a coastland as that of Greece, naturally became a great maritime power, and, like the Phœnicians, founded colonies of which Marseilles and Alexandria were the chief. The Greeks and the Phœnicians perforce came into conflict and fought for the possession of the key island of Sicily; but ere the struggle was decided, Rome, a new power, appeared on the scene, and she had the great advantage of occupying a central position from which she could carry out enterprises in both basins. Rome and Carthage struggled for supremacy, and the fall of Carthage left Rome in supreme possession of the commanding straits. The Roman Empire grew rapidly, and conquest followed all the natural routes leading from both basins, so that in time the Mediterranean Sea was the centre of a vast empire, and Rome was the mistress of the world. Later, the founding of a second capital, Constantinople, contributed to the decay of the empire, and Rome lost her power. The next great Mediterranean empire was that of the Arabs or Saracens, who spread from Asia to Africa and thence along the north coast of that continent to the Atlas region, finally overflowing to the Iberian Peninsula. They also occupied the eastern shores of the Mediterranean, from which the Crusaders failed to dislodge them. Even to-day the eastern and southern shores of the Mediterranean are Mohammedan, whilst in the Iberian Peninsula they have left indelible traces of their long occupation. It is owing to these Mohammedan conquests that there came a separation between north and south shores of the sea. But we must not forget that from all geographical considerations the two shores form part of one region and cannot be separated.

The Crusades fostered trade between East and West, and during the middle ages Alexandria, Venice and Genoa grew rich upon the profits of this trade. But the Turkish fifteenth-century conquests in the eastern basin interrupted these trading relations, which later received a mortal blow when the new route to the east was discovered by Vasco da Gama. The nineteenth century, however, saw the cutting of Alpine tunnels and the construction of the Suez Canal, and once more the Mediterranean became the highway to the East, and Venice and Genoa revived their former greatness. To Britain, this great highway to the East is of vast importance, for it is the shortest route to her Indian and Australian possessions. She holds, therefore, as "links of empire" along the route, Gibraltar, Malta, Cyprus, the Suez Canal zone, Perim, Aden, British Somaliland and Socotra.

EXERCISES.

1. "When Carthage fell, Rome became the mistress of the Mediterranean, and Roman arms penetrated all the natural routes opening from it." Give examples of the "penetration."

2. Compare the relative importance of the western and eastern basins of the Mediterranean in modern times.

CHAPTER XXXVI.

THE MEDITERRANEAN LANDS: THE IBERIAN PENINSULA.

Physical Features.

The Iberian Peninsula lies due south of the United Kingdom. It has a total area nearly twice that of the United Kingdom, but has less than three-fifths of the population. Five-sixths of its people (twenty-three and a half millions) live in Spain.

Three-quarters of the peninsula consists of the Meseta, an ancient, tilted, plateau block, and this is why the peninsula is so compact in shape. Against this massif we have the folded Cantabrians and Pyrenees in the north, and the Sierra Nevadas and their outliers, the Balearic Islands, in the south-east. The Er Rif and the Little Atlas, the coastal mountains of North-west Africa, are also prolongations of the Sierra Nevadas, separated, in their case, from the Spanish mountains by the break which forms the Strait of Gibraltar (see Fig. 80). Owing to its structure, the coasts of the Iberian Peninsula are steep and wall-like, and have very few good harbours. The plains are comparatively small and are separated by wide tracts of highland. They are chiefly in the valleys of the Guadalquivir and the Ebro, and along the west coast. Like the Balkans the Iberian Peninsula forms a link or bridge between Europe and another continent, but the great barrier of the Pyrenees, the plateau character of the peninsula, and the fact that the bridge soon leads to the Sahara desert, whilst the Balkan bridge leads to

Mesopotamia and the Indian Ocean, render the Iberian link of less value than the Balkan, and also give the Iberian railways a local rather than an international importance.

CLIMATE.

	Towns.	Lat.	Height in Feet above Sea Level.	Mean January Temp.	Mean July Temp.	Mean Annual Rainfall in inches.
1	Burgos .	42	2,900	36° F.	68° F.	19
	Madrid .	40	2,150	39	76	15.5
2	Santiago .	43	890	45° F.	68° F.	65
	Bilbao . .	43	50	46	70	60
3	Lisbon . .	48	300	51° F.	70° F.	30
4	Valencia .	39	75	49° F.	75° F.	18
5	Selville .	37	75	51°F.	80° F.	21
	Saragossa .	41	675	42	76	12

As with relief, so with climate, the great factor is the plateau character of the peninsula, for although surrounded by sea, the influence of the latter is restricted to comparatively small areas chiefly in the west and northwest. In the north, in the Cantabrian-Pyrenees belt, the climatic conditions are those of the West European type of climate, as is shown by the equable distribution of temperature, the heavy rainfall and its occurrence at all seasons, but especially in winter. (See figures for Santiago and Bilbao.) Elsewhere in the peninsula, the winter rainfall betokens the Mediterranean type of climate, but the actual amount received, as well as the seasonal distribution of temperature, varies so much, owing to differences of position and relief, that for our more detailed study it is impossible to consider the whole under one heading. The Meseta, *i.e.* the plateau, is cold in winter and hot in summer, and has a low rainfall. On individual days the winter cold and the summer heat are, of course, respectively much lower and higher than these figures, which are monthly means, denote. In Madrid, where the summer months have been described as infernal, individual winter temperatures of 14° F. and summer temperatures exceeding 104° F. are often experienced. The western margins enjoy the nearer presence of the Atlantic Ocean, and are consequently more equable and are better watered. The Mediterranean margins (compare the figures for Valencia and those for Lisbon) are more extreme and are much drier; indeed, many areas are so deficient in rainfall that agriculture is dependent upon irrigation. Two areas still remain, the plains of the Guadalquivir and Ebro. Both are very enclosed by highlands, but the former opens to the south-west, and is, therefore, better

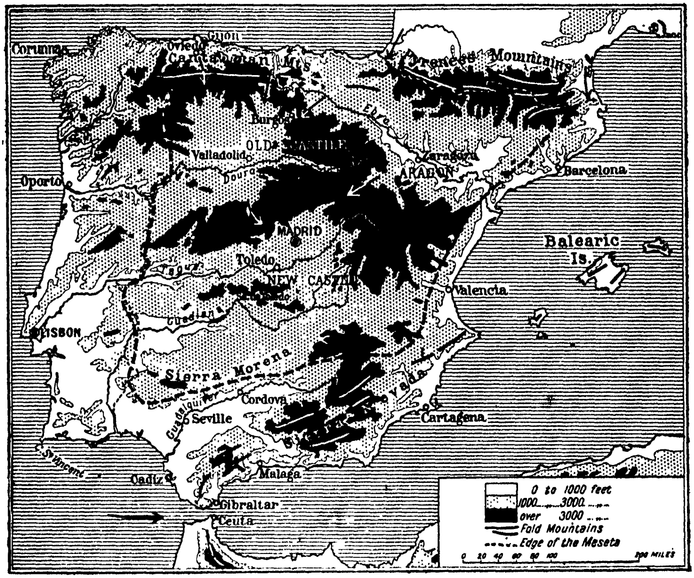

FIG. 80.—The Iberian Peninsula.

watered, whilst its more southerly latitude gives it higher temperatures than the latter (see Seville and Saragossa).

THE IBERIAN RIVERS.

Having grasped the leading facts of relief and of the distribution of rainfall no difficulty should be experienced in understanding the merits or demerits of the river system. In the first place it will be noticed that the main watershed is situated far to the east of the peninsula. This means that the long slope of the plateau is westwards, is away from Italy, and that the longest rivers will flow in that direction—*e.g.* the Tagus. It should also be expected that most Iberian rivers will have rapids, falls, or gorges at no great distance from the sea. In the case of those rivers having their lower courses in Portugal, *e.g.* Tagus, these interruptions occur approximately at the Portuguese frontier, which roughly coincides with the edge of the Meseta. The two rivers of the north-west, the Minho and the Douro, carry most water to the sea because they are fed from the Cantabrians, which receive rains all the year round. Plateau rivers like the Tagus and the Guadiana have cut steep, cañon-like valleys, which are mere gashes in the dry plateau. Their volumes vary very considerably with the season, and in summer they are frequently almost dry. Their Meseta courses are, therefore, of little or no value for navigation, whilst their value for irrigation is lessened by the depth of the valleys, which renders it very difficult and expensive to raise water to the plateau level.

The Guadalquivir (the name is a survival of the Moorish occupation and is really Wady-el-Kebir = Great River), the chief river of Spain, owes its special importance, as well as its name, to the fact that it is fed by the unfailing supplies of melted snow brought down during the dry summer by tributaries rising in the highest parts of the Sierra Nevada. Its volume is thus fairly constant. The bed of the river is so silted that boats cannot as a rule proceed beyond Cordova, whilst larger ships are only enabled to reach Seville by the assistance of dredging operations.

The Ebro rises in the Cantabrians and flows south-eastwards to the Mediterranean. Its basin is almost shut in by highlands, and is the driest part of the whole peninsula, especially the plain of Saragossa. The Ebro gorges occur in the lower valley, where the coastal heights of Catalonia come close to the south-eastern end of the mountains of Castile and Arragon. Like other Mediterranean rivers the Ebro enters the sea by means of a delta.

Natural Vegetation.

There is a saying that Africa begins at the Pyrenees, and in some respects it is very true, for in entering the country by rail from Bayonne in south-west France, the marked contrast between the forest-clad Cantabrians and the arid desert-like appearance of much of the Meseta is most striking. It is, however, more correct to regard the Iberian Peninsula as an intermediate zone or a transition between the West European region and the Sahara, since it partakes of the characteristics of both regions. Physical and climatic factors restrict the Iberian forests to the northern mountains and the west. Elsewhere extensive forests are not found. In Portugal and in Galicia, in north-west Spain, the cork oak is found. More than half of the world's supply of cork comes from Spain and Portugal. Oaks and chestnuts are also very common, whilst on the higher mountains there are extensive pine forests. Much of the Meseta is at best only a poor steppe land suitable for sheep-rearing. The best pastoral areas are found in the wetter west. According to published statistics, nearly thirteen per cent. of Spain and twenty-five per cent. of Portugal is unproductive. These are high figures, especially in the case of Portugal, where it is only fair to state there has been much improvement in recent years.

NATURAL REGIONS.

Before describing the leading characteristics of the natural regions of Spain and Portugal let us turn very briefly to the following question: "Why should there be two countries in the Iberian Peninsula?" The causes are partly geographical and partly historical. The international frontier roughly coincides with the western edge of the plateau-block of the Meseta, so that, as we have already seen, the rivers are interrupted by falls and gorges where they leave Spain for Portugal, and whilst their Spanish portions are not navigable, the limit of navigability is at or near the Spanish frontier. Portugal is well watered, and the Meseta is poorly watered, and the limit of reasonable rainfall is approximately the international frontier. The results of this are seen in the natural vegetation, the forests and rich pastures of Portugal being in striking contrast to the steppe of the western Meseta. The temperature differences between the two regions are also well marked. Thus, it is seen that Portugal is geographically different from those parts of Spain lying along her eastern frontier.

In the eighth century Mohammedan invaders from Morocco entered the peninsula by its natural southern gateway—the plain of the Guadalquivir—and gradually pressed in all directions until they had reduced the whole, except for a few strongholds in the Cantabrian mountains. From these centres of resistance the Moors were, little by little, driven southwards until in 1492 they were finally defeated at Granada. During the centuries that were occupied in this task, first one unit and then another obtained its freedom. Portugal was free from the Moors long before they were finally cleared from the rest of the peninsula, and, owing to the geographical factors we have already considered, was least able of all the Iberian States to co-operate very effectively with the struggle on the plateau. The country had thus the opportunity to organize and to consolidate as a separate political unit.

The Meseta.

The Meseta is the compact plateau which is responsible for so many of the distinctive features of the Iberian Peninsula. It is a low plateau crossed by higher ridges, of which the chief are the Sierra de Guadarrama, separating the plateau basin of Old Castile from that of New Castile, and the Sierra Morena, which forms the southern edge. The climate is marked by extremes of temperature and by drought, so that the sierra ridges are very bare, and much of the plateau surface is poor steppe. Pastoral occupations are, therefore, carried on, and more than one-half of the sheep in the peninsula are pastured there. The famous merino sheep, which were introduced by the Moors, were formerly of much greater importance than they are to-day. Extensive areas in the upper Douro and Tagus valleys have been brought under cultivation by means of irrigation, and much wheat is now grown, especially in the region around *Valladolid* which is called the "Granary of Spain." The vine grows widespread. Many parts of the Meseta are rich in minerals, but comparatively little has been done to develop this source of wealth, except in the Sierra Morena, where the famous Rio Tinto copper mines, which produce the greater part of the Spanish output (port, Huelva), and the Almaden quicksilver mines are found. The first lies to the south, the second to the north of the mountains. Iron is also mined at Leon, south of the western Cantabrians.

Madrid, the capital of the Republic of Spain, has no other advantage of site beyond the fact that its central position has made it the meeting-place of routes which come from all parts of the plateau. The surrounding country is bare and dry, and the climate is very trying. It became the capital simply because the great Charles V found that its brisk and rarefied air suited him better than Toledo. Therefore he fixed his residence in a spot which had been rejected by Iberian, Roman, Goth and Moor. *Toledo,* the old capital, stands on the Tagus, south-west of Madrid.

THE PLAINS OF THE GUADALQUIVIR AND THE EBRO.

These plains are the chief lowland areas of Spain. The valley of the Guadalquivir—the plain of Andalusia—is much more fertile and enjoys a better climate than the enclosed Ebro plain, where there are extremes of temperature and a deficient rainfall. But even in the better watered Andalusian plain irrigation is necessary.

Saragossa, the chief town on the Ebro, lies in the centre of an irrigated region producing olives, vines, tobacco and cereals, but not oranges and lemons, owing to the cold winters. The town has sugar-refineries and manufactures iron and steel.

Seville is the chief city of Andalusia, where the fertile soil and the warm climate combine to produce all the Mediterranean fruits, cereals and tobacco, as well as to make the Andalusian the rich, easy-going, merry person who so often is the wit of the Spanish drama. The city stands at the head of the ocean navigation of the river, and has largely superseded Cadiz as the outlet for the exports of Andalusia. It exports large quantities of Mediterranean products, particularly oranges, and has various industries, including the manufacture of iron ore mined in the Sierra Nevada. *Cadiz,* a fortified port founded by the Carthaginians, exports fruits, wines (especially sherry from Xeres) and salt, which is obtained by the evaporation of sea-water. In addition to the competition it has suffered owing to the dredging and canal improvements which have rendered Seville more accessible, the port also received a great blow from the superior facilities for dealing with ocean traffic now enjoyed by Gibraltar.

THE NORTHERN RANGES.

The Pyrenees separate France from Spain. Like the Alps they are folded mountains, but they present a more difficult barrier to communications than the Alps and they are crossed by very few roads. This is because of the uniform height of their ridges. There are, of course, cols and passes, but they are seldom more than 1,000 feet below the level of the peaks, of which Mount Maladetta, about the centre of the system, is the best known. Until 1928 railway communications between France and Spain had to pass round the ends of the Pyrenees, but in that year a new line was opened which crosses the mountains a little to the west of Pic du Midi. The present glaciers are small, but there are indications of very extensive glaciation in times gone by. Of these, the famous cirques, or amphitheatre-like endings of glaciated U-shaped valleys, are the best known. From the purely economic standpoint the Pyrenees are of little value. The few inhabitants are engaged in forestry industries and in pastoral pursuits. The tiny republic of Andorra (area, 191 square miles; population, 5,250) is under the joint suzerainty of France and the Spanish Bishop of Urgel.

The Cantabrians are one of the richest parts of Spain. This is partly due to the climate, which is West European in type, so that there is no lack of water, whilst the temperature conditions do not, as in other parts of Spain, make it impossible to put forth the maximum of energy during the summer. It is also partly due to the very rich mineral deposits which the mountains contain, as well as to the valuable forests. The presence of a strong, energetic Basque population is also a great asset in the economic development of the region. Two-thirds of the total output of Spanish coal comes from the district of *Oviedo* in the Asturias. This important town commands the route via Leon, which we have already noted as an iron-mining centre, to *Gijon,* the port. Large quantities of iron ore of the very best quality are mined in the Cantabrians, and a certain amount is smelted at *Bilbao* and *Santander,* but more is exported, especially to the smelting towns of South Wales. The western Cantabrians and Galicia are noted for cork, obtained from the bark of the cork oak. Galicia, as should be expected from its indented coast and the numerous rias, is the only part of the peninsula supporting a considerable fishing population. *Corunna* and *Vigo* are the chief Galician ports, and both are engaged in sardine fishing and packing. *Ferrol* is a naval station.

PORTUGAL.

The Atlantic margins have the best climate in the peninsula. The equable distribution of temperature, the abundant rainfall and the rich soil give to Portugal splendid opportunities of becoming a rich agricultural and pastoral country. The land is also rich in minerals, especially in copper and iron. There are few lands so richly endowed by nature, and so much neglected. Apart from a few coastal districts which have long been in contact with other countries, and have more energetic inhabitants than are found in the interior, the wealth of the country is almost neglected. Even in agricultural products Portugal is not self-supporting, whilst the methods employed on the farms are often most antiquated. It is true that her forests supply one-half of the world's output of cork, but in many parts, particularly in the south, they are chiefly of value for the rearing of pigs, which can be fed on acorns. Except for wolfram, collected from the surface of the land in the north, and for a comparatively small amount of iron and copper obtained in the southern provinces, the mineral wealth is very neglected. The main roads, except in the immediate vicinity of Lisbon and Oporto, are very poor indeed and hamper transport. All this is very unfortunate, especially when it is recalled that there is a large, persistent emigration, and this from a population of about six millions. Half of the country is actually waste and uncultivated, whilst the education of the people is in a most backward condition.

Lisbon, the capital of the republic, is the chief port of southern Portugal. The city stands on the north bank of the bottle-shaped estuary of the Tagus. Its chief trade is in cork, fruit, and the produce of the Portuguese African colonies, *e.g.* rubber and cocoa. *Oporto,* at the mouth of the Douro, is the outlet of a rich wine-producing region. The best known wine is the famous Port, so called from Oporto.

THE MEDITERRANEAN MARGINS.

This region is the most typical " Mediterranean " region in the peninsula—*i.e.* it has very warm summers, mild winters, and practically the whole of its rainfall during the winter months. Unfortunately, however, the rainfall is deficient in amount, and it is necessary to use irrigation methods. Most of the irrigated areas, called *huertas,* were made by the Moors, who paid great attention to terracing and irrigation. The long, dry summers are suited to softer fruits, and also permit the ripened fruit to be dried in the sun. Therefore the Mediterranean lands, and particularly the famous huertas of Valencia and Murcia, produce mulberries, vines, oranges, lemons, figs, peaches, apricots, pomegranates, and even some cotton, sugar and rice. Malaga, Cartagena, Alicante, Valencia and Barcelona are all engaged in the fruit and wine trade. Silk goods are manufactured at Murcia and at Valencia.

Iron ore is mined in the Sierra Nevada, which now produces about one-third of the Spanish output, and is exported from Seville, Almeria and Cartagena. Copper and other minerals are also found, but are not so important as iron.

Barcelona, the chief port of Spain, is almost as big a city as Madrid. It is in Catalonia, whose people are so industrious that the easy-going people of southern Spain say that the Catalan will get blood out of a stone. It is partly on this account that Barcelona is the chief industrial centre in the country. Besides exporting the wines, fruits and nuts of the country districts, it and other neighbouring towns are engaged in the manufacture of textiles, particularly cotton.

The Balearic Islands, which belong to the Mediterranean region and have all the typical Mediterranean products, stand above an eastern submerged prolongation of the Sierra Nevada. The chief town, Palma, is on Majorca. Minorca for a time belonged to England.

GIBRALTAR.

The famous Rock of Gibraltar is three miles long from north to south, three-quarters of a mile wide, and a quarter of a mile high. On the north side it drops very steeply to a low and narrow isthmus, which connects it to the mainland, and across which a strip of neutral territory separates the Rock from Spain proper. The Rock is honeycombed with passages, and is very strongly fortified. It is not merely a fortress commanding the western gate of the Mediterranean; it is also a great port, for the construction of moles, the provision of cold storage accommodation, and the enormous supplies of coal maintained there, have made it at once a commercial and a naval harbour of first-class importance. Gibraltar has been British since 1704.

CHIEF COMMUNICATIONS.

We have already noted that the peninsula is entered by railways which pass round the ends of the Pyrenees, and also that Iberian railways have a local rather than an international importance (see p. 382). Within the peninsula itself the great obstacles are the plateau edges and the east and west mountain ridges rising above the general plateau level. The difficulty is also increased by the character of the river valleys. One other point to notice is, that the bulk of the people live along the sea coasts, so that the construction of the plateau railways (which has made Madrid the centre of the whole system) was delayed owing to the great cost and the uncertainty with regard to revenue. Besides, the coastal centres of population can more easily and more cheaply communicate with each other by water than by land.

The route from south-west France passes through San Sebastian and crosses by a low pass to the valley of the upper Ebro, from which it passes to Burgos by means of the Pass of Pancorbo. Passing Valladolid the line crosses the Sierra de Guadarrama and then descends to Madrid. The line which rounds the eastern end of the Pyrenees first follows the coast via Barcelona, then the Ebro to Saragossa, and finally crosses the very difficult barrier of the main watershed of the peninsula. Other lines from Madrid run south-eastwards to Valencia, Alicante and Cartagena; southwards to the valley of the Guadalquivir, Algeciras and Malaga; and south-westwards, following the direction of the Tagus, to Lisbon. The east coast, from the French frontier to Cartagena, is followed by a line which, except at the prominence ending in Cape Nao, keeps to the very narrow coastal plain the whole of the journey. Along the west coast a railway from Lisbon runs northwards via Oporto, to the mouth of the Minho, whose valley it follows inland as a means of reaching Corunna, instead of keeping to the coast.

CONCLUSION.

It has been stated that the glamour of the past makes the Spaniard and the Portuguese indifferent to the realities of the present. It is certainly true that neither over-exerts himself to improve his environment. In both countries the exploitation of the mineral wealth is largely left to foreigners. Of course, the climate is against the putting forth of human energy on the scale found in Britain and the countries of north-west Europe, and the infertility of large tracts, as well as the lack of rainfall in the centre and east, gives more excuse for the Spaniard than for the Portuguese. It would appear that the glorious exploits of Prince Henry the Navigator and his immediate successors overstrained Portugal. Its present population is extraordinarily mixed, especially in the south, where Arabs, Berbers, and even negroes were introduced to supply the shortage of agricultural workers. Both Spain and Portugal have suffered, and are still suffering, from the lack of good roads. Even the recent development in railway construction—the first railway across the east and west ridges was only completed in 1890—has been diminished in value owing to the fact that through-running to and from France is rendered impossible because the Spanish gauge differs from that of France. This has a certain military value, but the "break of bulk" which it causes is detrimental to commercial relationships.

Spain has suffered in recent years owing to the loss of Cuba, Porto Rico and the Philippines, which were practically the last of her former enormous empire in the New World and elsewhere. Her fall from greatness is a long story. It was bad for Spain to gain her New World empire and its great mineral wealth with comparatively little effort. It was disastrous that the home industries—introduced, fostered and perfected by the Moors—should have been despised and neglected. The Spaniards never really tried to colonize their possessions in the New World, and were chiefly concerned in exploiting their too easily attained wealth. Disunion at home and rebellious colonists abroad shattered the great empire, and to-day their sea-exploits of the Age of Discovery appear to have been simply a temporary outburst on the part of a people whose land is essentially continental and non-oceanic.

EXERCISES.

1. Draw typical sections to bring out the leading features of the relief of the Iberian Peninsula.
2. Give geographical or other reasons for the presence of two political units within the peninsula.
3. Compare and contrast the Iberian with the Scandinavian Peninsula in as many ways as you can.
4. Carthaginians, Romans, Goths, Vandals and Moors have all entered Spain. Do you know of any traces left by each?
5. "Roughly speaking, it may be said that Spain to-day manufactures something of nearly everything, and that, were it not for the fact that the quality and quantity in many cases do not fill the requirements of the market, the opportunities for foreign exporters, labouring under the handicap of the high Spanish tariff, would be far from great." Comment on this.

CHAPTER XXXVII.

THE MEDITERRANEAN LANDS: ITALY.

PHYSICAL FEATURES.

ITALY is about the same size as the British Isles, and has a population of some thirty-five and a half millions. The relief is comparatively simple. The country is made up of: (i) Portions of the southern Alps, (ii) the great alluvial plain of Lombardy, (iii) the long and narrow peninsula which, with Sicily, is largely the folded Apennines and their slopes, and (iv) the island of Sardinia, which, like the French island of Corsica, is a remnant of an ancient crustal block.

CLIMATE.

In peninsula and insular Italy the climate is typically Mediterranean, but the plain of Lombardy and the Alpine areas have the more extreme climate associated with continental areas, although the winters rarely reach freezing-point. They are certainly not Mediterranean, for the rain falls at all seasons, so that, for example at Milan, no month has less than five per cent. and none more than twelve per cent. of the total, but the maximum fall is in early summer and in autumn. It is, therefore, only necessary to divide Italy into two natural regions: Continental Italy and Peninsular and Insular Italy. As we are already quite familiar with these types we can turn our attention to one or two special points directly or indirectly associated with the Italian climate.

In Italy we have many splendid examples of the influence of shelter given by mountain ranges. In peninsular Italy the west is wetter than the east, since the rain-bearing winds are the winter westerlies. The east is also exposed to the cold *bora* winds from the north-east, from which the west is sheltered by the Apennines. The plain of Lombardy is enclosed by mountains except on the east. It is subject to cold winter winds from the Alps, whilst the Apennines prevent it from receiving the benefit of the warm westerlies. On the other hand it has frequent *föhn* winds, which partly account for the cultivation of rice and cotton.

Italy—especially peninsular Italy—is famed for its sunny skies. The cloudy days come in winter, when the rain falls. The influence of the sunny climate is seen in the extensive development of outdoor life, as well as in the preservation of ancient buildings and monuments.

The Italian malaria problem is also bound up with the climate, but also with history. The deforestation of large areas of the Apennines has resulted in the exposure of the soil, and its consequent removal to the delta or the plains of the lower valley of some river. This, in addition to the deltaic material which would accumulate in any case, owing to the almost tideless character of the Mediterranean, gives extensive marshy lowland tracts. The most famous are the Maremma, south of the mouth of the Arno, the Campagna, at the mouth of the Tiber, the Pontine marshes, north of Naples, and the extensive marshes of the Po delta. Better drainage and the planting of trees, notably the Australian eucalyptus, are lessening the danger and bringing valuable land under cultivation, but every year there are still very many thousands of deaths caused by malaria, from which a large percentage of southern Italians are never really free.

CONTINENTAL ITALY.

This consists of (i) the Southern Alps, (ii) the Plain of Lombardy.

The Southern Alps.—As a result of the Great War Italy has very considerably increased her Alpine territories. Broadly speaking the new "Trentino" boundary is the watershed between the feeders of the Adige and those of the Drave and the Inn (see Fig. 76). Italy also gains the peninsula of Istria and the coastland province which includes the ports of Trieste and Fiume. These ports also serve Austria, Hungary and Jugo-Slavia.

In these Alpine provinces of Italy economic activity is practically confined to the lower slopes of the mountains and to the valleys, many of which are partly occupied by lakes. All are important as means of communication, and six of them are followed by Trans-Alpine railways. These should be found in an atlas, and the importance of Turin, Milan, Verona and Udine noted in connection with them.

Vines, olives, mulberries, and maize are cultivated in gardens and on terraced slopes. The valley and hill pastures support pastoral occupations, whilst the mountain forests encourage the lumbering industry. Some iron is found and smelted, and some silk is manufactured, whilst the large number of waterfalls provides a source of power of great value in a country deficient in coal.

The Plain of Lombardy.—This region offers a splendid example of an alluvial plain. Formerly the Adriatic Sea extended further westwards, and occupied the depression between the Alps and the Apennines. The plain has been created by the deposition of solid materials brought down during long ages by the rivers, of which the Po is the chief. The plain is constantly being extended eastwards, and perhaps even the Adriatic Sea will be filled eventually, for that is the task upon which the rivers are engaged. One great disadvantage of the Po, a drawback common to most rivers of its type —*e.g.* the lower Mississippi—is that in its plain course it is constantly dropping silt upon its bed, so that it flows on a self-created ridge which is higher than the level of the surrounding plain. The river has thus to be kept in bounds by great embankments, which are liable to burst, especially in times of flood. The Adige, which drains the Trentino, enters the sea by a separate mouth a little north of the Po. The streams of the

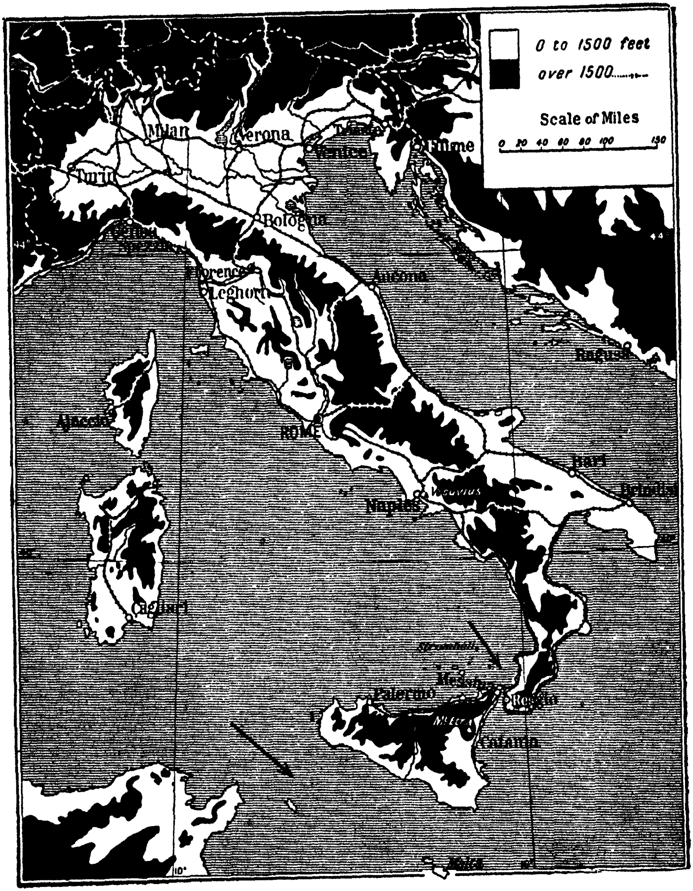

FIG. 81.—Italy. Relief and Routes.

north-eastern extension of the plain (Tagliamento, Linenza, Piave, Brenta, etc.) flow practically parallel to each other, and thus offer successive lines of defence to an enemy attacking the plain from the north-east. Before and during the Great European War, it was, however, a great military disadvantage to Italy that the Alps which flank this part of the plain were controlled by Austria. This has been rectified, for, as we have already seen, the new Italian frontier more or less takes the line of the watershed between the basins of the Inn and the Drave to the north, and the Adige, Piave and Tagliamento to the south. Italy has also gained the important ports of Trieste and Fiume, as well as Pola and Zara.

The fine alluvial soil of the plain of Lombardy makes road-making difficult, but it is exceedingly rich for agricultural purposes. Large crops of wheat, maize, mulberries, grapes, hemp, flax, rice and a small—practically negligible—amount of cotton are produced. So rich is the soil, and to such an extent is artificial irrigation practised, that as many as from four to six crops are frequently obtained on the same land in the same year. Rice is chiefly grown in irrigated areas, and in the swampy districts of the delta. Both rice and maize form leading articles of food. The mulberry is grown to feed the silkworm. Cotton-growing became important during the American Civil War, but the resumption of the exportation of American cotton checked its cultivation, whilst the modern competition of Egypt provided a further check.

Pastoral occupations are also extensively carried on, particularly cattle-rearing and dairy-farming, as is shown by the fame of Gorgonzola and Parmesan cheeses.

The plain of Lombardy is the chief manufacturing area in the whole Mediterranean region. Extensive manufacturing in Italy is a comparatively recent feature. The natural advantages which have assisted such a development cannot be described as very great. It is true that the great abundance of raw silk, the cheap labour afforded by a population too large to be supported by agriculture alone, and the examples set by the neighbouring countries of France and Switzerland, all greatly helped. On the other hand, the available water power, large as it is, does not compensate for the lack of coal, whilst the iron ore of the Alpine valleys and the island of Elba is not sufficient.

Naturally, silk manufacturing comes first, but cotton and woollen manufacturing—the latter being of importance owing to the cold winters—are also engaged in. The cotton goods of Italy find a ready market in Argentina. The spread of textile manufacturing has been accompanied by the growth of iron trades. Milan and Turin are the chief centres engaged in all these trades, but there are, of course, many other towns as well. Venice and Trieste are noted for shipbuilding.

Milan, the second largest city in Italy, occupies a magnificent position with regard to the control of routes. From the top of its fine cathedral extensive views of the surrounding plains can be obtained, whilst northwards the snow-capped Alps, and southwards the Apennines, stand up against the skyline. The city grew up as the "middle-plain" city, where the ancient road skirting the southern base of the Alps, and passing from Venice through Verona, Brescia, Milan, Aosta and thence to the St. Bernard Pass, crossed the road from Genoa to Como. These roads and the railways which follow them are still important; but the site of the city was further enhanced by the convergence upon it of the routes via the Simplon and St. Gothard Tunnels. Its textile and engineering trades have still further increased its importance.

Turin stands at the head of the navigation of the Po, and commands the Dora Riparia route to the Mont Cenis Tunnel and the Rhone basin (see Fig. 82).

Venice is the "Queen of the Adriatic." The factors which aided the foundation of this city are now a disadvantage. It is in this respect less fortunate than Milan. The city is built on over one hundred sandy islands on the edge of a shallow lagoon. When Rome fell certain Roman families fled to the marshes of the Po delta, but driven from there they sought refuge with the fishermen who inhabited the Venetian islands. (See also p. 380.) The city, which is reached by a railway built on a causeway, is built on piles driven into the marshy soil. It has some magnificent churches, art galleries, palaces, bridges and public buildings, in all of which the former greatness of the city is visibly writ large. Shipbuilding and artistic manufactures—*e.g.* gold lace, glass, etc.—are leading occupations.

PENINSULAR AND INSULAR ITALY.

The "Mediterranean" parts of Italy are more backward than the plain of Lombardy. In the latter the towns are busily engaged in manufacturing, and the country districts are inhabited by industrious and go-ahead farmers, but in southern Italy the people of the country districts are often very poor; the fields and gardens are cultivated by methods which are often antiquated; the percentage of illiterate peasants is exceedingly high, and the emigration figures are high enough to be a source of grave national concern. But even in southern Italy the modern industrial movement is being felt, and towns like Florence, Naples, and even Rome, are rapidly becoming manufacturing centres.

The Italian Riviera.—This part of Italy is an extension of the French Riviera, and forms the province of Liguria. The coastline follows the folds of the mountains, and in most places the land rises steeply from the sea, so that cultivation practically depends upon the terracing of the hill-sides. This is extensively carried out, for the southern slope gives temperature conditions extremely favourable to the cultivation not only of olives, vines and mulberries, but also of oranges and lemons, which are usually associated with the southern provinces. The gorgeous sea and land scenery and the mild winter climate have aided the growth of many winter health resorts.

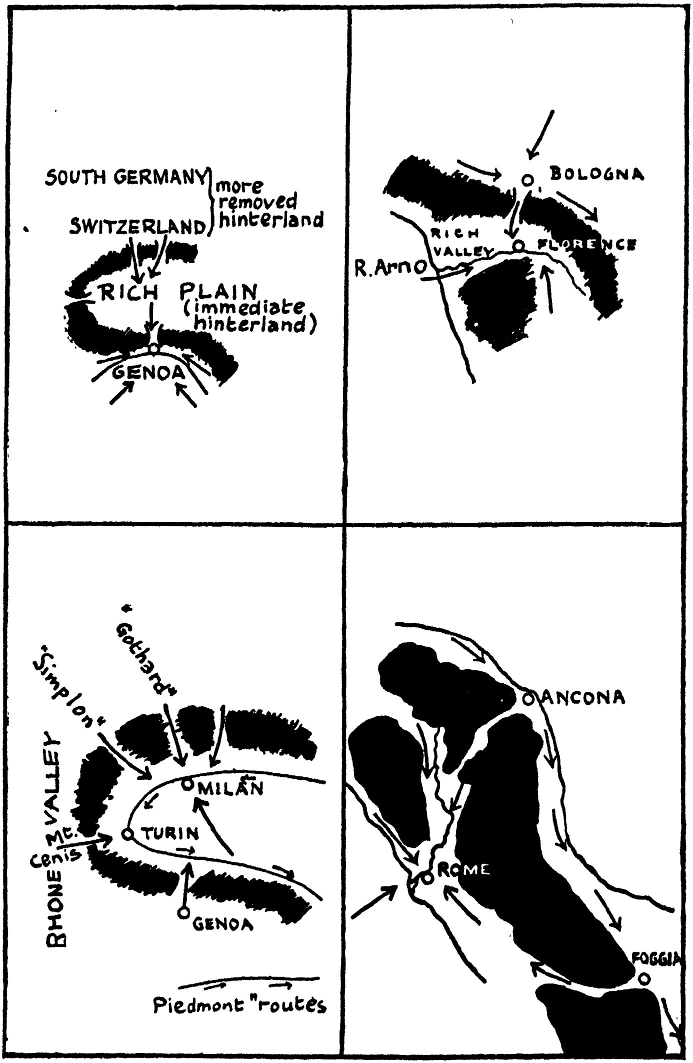

FIG. 82.—Sketch map showing the importance of the sites of Genoa, Florence, Milan and Rome.

Genoa, the birthplace of Columbus and many other famous sailors, is the largest town and the chief port. Its natural hinterland is the western part of the plain of Lombardy, from which it is separated by the mountains, although, fortunately, just behind the port there is the low Bochetta Pass. But the cutting of the great Simplon and St. Gothard Tunnels has extended the port's hinterland to Switzerland and even to southern Germany. Besides being a port, Genoa has also busy cotton, shipbuilding, soap (from olive oil) and iron industries. *Spezzia,* east of Genoa, is a naval and shipbuilding centre; at *Savona,* to the west, there are engineering works.

The Peninsula and Sicily.—The Apennines, which are probably the youngest mountains in the world, begin at the Bochetta Pass and run south-eastwards throughout the length of the peninsula. Notice how they leave the west coast, sweep across to the east coast, and finally return, in the "toe" of Italy, to the west coast. That part of Italy drained westwards by the Arno and the Tiber, and enclosed by the great eastern bend, is the portion of the country which has played a particularly prominent part in the history of the peninsula. A glance at a physical map is sufficient to show that all the highland areas of peninsular Italy are not included in the Apennines. Inside the eastern bend just referred to there is a rather complicated foreland of hilly country with volcanic areas noted for such typical crater lakes as that of Bolseno. In Apulia, the "heel" of Italy, the foreland consists of low limestone plateaus and plains. In Calabria, the "toe," and in north-east Sicily, there are remnants of ancient rocks, which, with Sardinia, Corsica and Elba, long ago formed parts of a common massif.

These differences in structure are mentioned because they produce differences in human activities. The Apennine folds are exceedingly poor in minerals, but there are forested areas where large numbers of chestnuts thrive and supply an important article of food as well as timber. In the vicinity of *Carrara,* north of the mouth of the Arno, the limestones have been changed to marble, which is quarried there. In some of the volcanic areas, particularly in the Alban Hills and in Campania, there are some of the richest olive, vine, etc., gardens in all Italy. In Apulia, the dry climate, the fertile soil and the extensive plains all favour the growth of wheat on a large scale, so that this province is the chief wheat-growing area in the country. It produces the hard wheat which is especially suitable for the manufacture of macaroni. The ancient rocks of Elba are rich in iron ore, whilst in Sardinia lead and zinc are mined.

The river Arno drains Tuscany, whose chief cities are Florence and Leghorn. *Florence,* in the plain of the upper Arno, one of the richest little "regions of increment" in the Mediterranean (see p. 284), is the centre of a rich region producing the "leggy," hard wheat whose straw forms the basis of a straw-plaiting industry, and whose grain is manufactured into macaroni. A low pass over the Apennines gives easy rail communication with Bologna. *Leghorn* is the Tuscan port, but it is not situated at the mouth of the Arno owing to silting troubles. *Pisa* is the old port.

The Tiber, the chief river of peninsular Italy, rises in the Apennines and flows due southwards to its delta mouth among the marshes of the low coastal plain. Its valley is followed by important routes. *Rome,* the great city of the Tiber basin, occupies a very important site. It is the only Italian city whose population exceeds one million. It was built: (i) at the head of the navigation for ships of that day, and was thus sufficiently far from the coast to be protected from pirates; (ii) on the left bank of the river at a point where a cluster of seven low hills gave it a healthy and dry site above the marshes of the lower valley; (iii) at a point where an island rendered the bridging of the river a matter of comparative ease; and (iv) at a point upon which many routes converged. All these, together with its excellent central position with regard to the control of the Sicily bridge between both

Mediterranean basins, helped to make the city the greatest of the ancient world. The mouth of the Tiber is now silted, and the port of Rome is Civita Vecchia. Much of the city is of modern origin, but it still retains monuments of its past greatness, such as the ruins of the Forum and the Colosseum. It is the Italian capital and contains within its borders the tiny, politically independent Papal State which to-day is practically the Vatican, the home of the Pope.

Naples, the third largest town in Italy, has the great advantages of having the only really good harbour between Leghorn and Messina, and of commanding the most important route across the Apennines, *i.e.* the one via Foggia, as well as the routes along the west coast. In modern times it has become a great industrial centre, and in this it has been assisted by the presence of large supplies of cheap—if unskilled—labour, as well as by special concessions and privileges granted by the municipality to those erecting factories there. It has textile, lace, engineering and macaroni industries.

Sicily is a continuation of the Apennine chains and forms a link between peninsular Italy and the Atlas ranges. In the east the great volcano of Etna, which is about eighty miles in circumference at its base, rises to a height exceeding two miles. The sulphur obtained in this part of the island forms the chief mineral wealth of Sicily, and gives employment to many people engaged in refining it prior to export, but the industry has declined in recent years. The island is exceedingly fertile and produces all the Mediterranean products, especially wheat and wine. *Palermo,* the capital, is noted for its orange and lemon groves. It has also shipbuilding and iron industries. Communication with the mainland is chiefly between *Messina* and *Reggio.* The former stands in a district famous for its mulberries and hence has silk industries. The city was very largely destroyed by a great earthquake in 1908. *Catania,* on the east coast, has sulphur refineries. The island of Stromboli, in the Lipari Islands, is an active volcano, picturesquely called the "Natural Lighthouse of the Mediterranean."

SARDINIA.

This island, together with Corsica, Elba and certain small parts of the peninsula and Sicily, are remnants of an ancient crustal block. The interior is a wild, rugged, forested highland rising to about 6,000 feet. The lowlands are marshy and malarial. The island has mineral deposits, especially lead and zinc, and there is a considerable trade in salt, obtained by the evaporation of sea-water. The surrounding seas are good fishing grounds, but unfortunately, forests, mines and fisheries are neglected and not developed as they should be. Mediterranean fruits, wheat and pulses are grown, and horses, sheep and goats are bred. The capital and chief port is *Cagliari,* on the south coast. The island of Elba, where Napoleon was interned for a time, has mines producing very fine qualities of iron ore.

CHIEF ROUTES.

Italy is like a great pier built out into the Mediterranean. It has thus become the means of giving a partly overland route to the East, and this has been enormously helped by the tunnelling of the Alps. These improved means of communication between Italy and Central Europe have also been of vast importance in the modern industrial development of the country.

Alpine railway routes reach the plain of Lombardy, from France (Mont Cenis Tunnel), from Switzerland and the Middle Rhine (Simplon and St. Gothard Tunnels), from Tirol, Bavaria and central Germany (Brenner Pass—no tunnel), and from Vienna (Semmering Pass and the lower eastern Alps). All these lines are linked up by an east-and-west line skirting the southern margins of the Alps from Udine to Turin. The overland route from Calais and Paris reaches the plain at Turin, and then follows the ancient Emilian

Way along the eastern margins of the Apennines to Brindisi or Taranto, from which fast steamships leave for Port Said, where the eastern mailships are met.

Just as the long, narrow peninsula with its more or less central mountain ridges helped the development of the east coast route, so we have a west coast route. The chief connections between the two systems cross low Apennine passes between Genoa and Alessandria, Florence and Bologna, the upper Tiber and Ancona, and Naples and Foggia (see Fig. 82).

The rivers of Italy are of very little value for navigation purposes, except for very small craft, of which considerable numbers ply on the rivers and irrigation canals of the basin of the Po. The long coastline promotes sea communications, and has led to the growth of a considerable coastal trade largely carried on by sailing ships; but the east coast has few harbours, and in this respect is in striking contrast to the opposite coast of the Adriatic.

In ancient times Italy was the centre of the known world, and her capital, Rome, was the meeting-place of every race and creed. Later, the long and unhappy political division of the country, and the opportunity that was missed of taking a leading part in the great period of discovery, caused her to sink in importance. But the opening of the Suez Canal, the piercing of the Alps, and the consolidation of the country into one political unit, have enabled her to resume her place in the world, and although her late entry has left her without such valuable colonial possessions as are held by most of her rivals, the great energy which has been put into the establishment of new industries, and the success of the Italian colonist both in South America and in the United States, are indications of a great modern renaissance in this sunny land. The extension of Italian influence to Africa (Libia, Somaliland and Eritrea), to the islands in the south-east of the Ægean, and to the eastern shores of the Adriatic also points in the same direction.

THE MALTESE ISLANDS.

This group of islands owes its importance to its command of the straits between the eastern and western basins of the Mediterranean, a position of such strategic value that it has been held or fought for by Phœnicians, Greeks, Carthaginians, Romans, Arabs, Crusaders, Turks, French and British. The chief island is Malta, whose area is about two-thirds that of the Isle of Wight. Gozo and Comino are smaller. *Valetta,* the capital, has a magnificent harbour, which is so important both as a naval repairing and refitment station and as a commercial harbour that it is too small for the demands made upon it.

The islands are exceedingly fertile and produce all the Mediterranean products in great profusion, as well as early potatoes and fruit for the English markets. Large numbers of goats and sheep are reared, the former providing most of the milk supply. There are also numerous mules and donkeys, which do most of the transport work. Hand-made lace is a noted special industry.

EXERCISES.

1. Contrast the Plain of Lombardy with the Prussian Plain as regards structure, climate and industries.

2. Draw a map of Italy shading the high ground. Indicate the routes by which the Plain of Lombardy is entered by land; the chief routes across the Apennines; the east and west coast peninsular routes; indicate the chief centres for the production of silk, olives, oranges, wheat, sulphur, iron, rice, maize, dairy produce.

3. The following are the chief British imports from Italy arranged in order of values: Silk manufactures, eggs, hides, cheese, canned vegetables, olive oil. In which parts of Italy were these articles produced and by what routes did they probably reach Britain?

4. Draw sketch maps to illustrate the importance of the sites of Rome, Naples, Milan and Turin. Compare your results with Fig. 82.

5. In what directions has Italy made great progress in recent years? Compare the progress made by Italy with that made by Japan. What dangers are there in such "progress"?

CHAPTER XXXVIII.

THE BALKAN PENINSULA.

PHYSICAL FEATURES.

THE Balkan Peninsula is a bridge between Europe and Asia. The great land route to the East lies across it, and since this leads over Asia Minor and the plains of the Tigris and the Euphrates to the Indian Ocean, it is a bridge of great importance. To command this great land route, stretching from the North Sea to the Persian Gulf, was one of the chief reasons which tempted Germany to disturb the peace of Europe. In this connection it is important to notice that the little country of Serbia, as it was in 1914, sat astride this route, a fact which needs to be kept in mind by the student of the causes of the outbreak of the Great European War.

The greater part of the peninsula consists of highlands which shut off river valleys and basins from each other, and have thus helped to give to the peninsula the complicated and different racial and political problems which again and again cause war and rumours of war, and provide Europe with its Near Eastern Question. Complicated as is the relief of the Balkan Peninsula, it may be considered under three headings:—

(i) Along the west coast the Alpine ridges of Dalmatia are continued southwards, and may be traced throughout the whole length of the western part of the peninsula, and beyond, through the islands of the Crete and the Cyclades group, to the mountains of Asia Minor. In Greece, which has been so sunken that the river valleys have almost disappeared, the direction of the ridges is clearly seen in the finger-like peninsulas of the Morea. The Dinaric Alps and the Pindus Mountains are the best known of these western mountain ridges. As the former lie close to the coast and run parallel to it, communication with the interior is difficult, so that the magnificent harbours of the rugged coastline are depreciated in value. The Dalmatian coastline should be compared with that of Norway, and contrasted with that of eastern Italy, which lies on the other side of the Adriatic Sea. Much of this region consists of *karst-land*: that is, it is a limestone region,

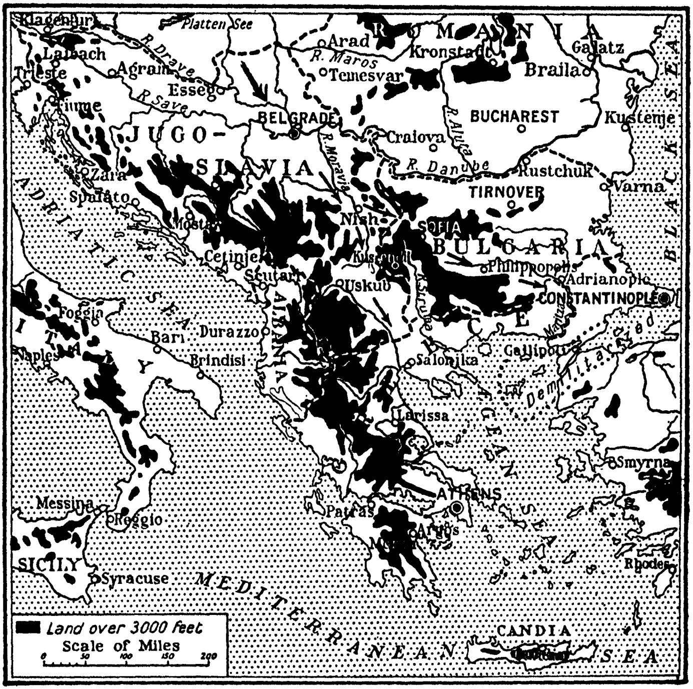

FIG. 83.—The Balkan Peninsula. Relief and Chief Routes.

in which, owing to the porous nature of this rock, there is little surface water and scant vegetation. The rivers often disappear through sink-holes and flow underground for considerable distances, often never reappearing at the surface. Even where there are rivers, they usually flow at the bottom of deep, steep-sided gorges and are of little value either for navigation or for irrigation. But in some places, either in low-lying areas where water comes to the surface, or where there are river plains built of silt spread out during winter flood periods, agriculture can be carried on. Considerable areas have been turned into karst-lands by the ruthless destruction of forests. This exposes the surface to weathering, so that the soil is washed away and the making of a karst region begins.

(ii) In the north-east, the Balkan Mountains are continuations of the great sweep of the Carpathians, and they may be traced eastwards through the Crimea to the Caucasus.

(iii) The western mountains keep close to the western coast, and the Carpathians–Balkans system makes its great bend because the heart of the peninsula consists of an ancient crustal block against which the younger mountains were thrown into folds. This central block of older rocks, which has been greatly denuded, comprises, not only high mountainous areas like the Rhodope and Shar Dagh, but also plateaus, river valleys and broad plains. Curved lines, drawn from Belgrade to the Bosphorus and from the same city to the island of Negropont, roughly bound this region (see Figs. 59 and 83.

Three Balkan rivers are of outstanding importance. They are the *Morava,* which flows northwards to the Danube; the *Vardar,* which continues the line of the Morava southwards to the Ægean Sea; and the *Maritza,* whose valley leads routes following the Morava on towards Constantinople. These river valleys offer the best routes in the peninsula, and times and times again they have determined the directions taken by campaigns.

CLIMATE.

The western and southern coastlands have mild winters and hot summers. The north-east has very cold winters and very warm summers, whilst in all the highlands the effect of elevation is to reduce the temperature at all seasons. The rainfall in the west and south occurs largely in winter, whilst in the north-east, *i.e.* in Serbia and northern Bulgaria, most rain falls in summer. The heaviest fall is on the western highlands, and the amount generally decreases towards the north-east, but towns like Athens and Salonika, which are to the lee of the western highlands, have less rain than Constantinople. Indeed the Salonika, Athens and Dobrudja areas are the driest in the peninsula. The west has a mean annual rainfall exceeding thirty inches (the north-west has from forty to sixty inches), the three areas mentioned have less than twenty inches, and the remainder from twenty to thirty inches.

As will be seen from this short account, the peninsula has two distinct climatic regions. In the west and south we find the characteristics of the Mediterranean type, and in the north-east those of the continental type.

NATURAL VEGETATION.

In the Mediterranean area evergreen forests are found on the lower slopes of the mountains. In the western mountains large areas are dry limestone karstlands, and are either bare or have sufficient pastures to support herds of cattle and flocks of sheep and goats. The forests of Greece, southern Serbia and Bulgaria, and of Turkey have been largely cut down, with results disastrous alike to agriculture and to the lands adjoining the mouths of the rivers, for the soil has been removed by weathering and by the rivers, and has been spread out to make marshy malarial regions along the coastlands. In Serbia and on the northern slopes of the Balkans the forests are deciduous, and chiefly contain oaks and beeches, so that pig-keeping becomes an important occupation. The Dobrudja is so dry that it is semi-desert, a fact borne out by the use of the camel as a beast of burden.

THE JUGO-SLAV KINGDOM, OR THE SERB-CROAT-SLOVENE STATE.

The former small country of Serbia now takes the leadership of a large state whose area is nearly 100,000 square miles, and whose people number some 14 millions. It covers the territory occupied by the Jugo-Slav, or south Slav peoples, of whom the Serbs, Croats and Slovenes are the chief, and includes Serbia, Bosnia, Herzegovina, Montenegro, Croatia, Slavonia and Slovenia. Three regions may be distinguished in this new country:

(i) The Adriatic margins have the typical Mediterranean climate and products, and in this region the vine is the chief source of wealth, and wine and olive oil are exported. (ii) The inner belt of dry mountainous uplands support pastoral occupations, except in the river valleys, where agriculture takes place. (iii) The lands south of the Drave, together with the Banat (both gained from Hungary), are noted for their agriculture and stock-rearing (in the Banat the summers are hot enough for rice), whilst in "old Serbia," where the climate is continental in character, the oak and beech forests of the hills support enormous numbers of pigs, and in the plains wheat and maize, tobacco, wine and plums (for brandy and prunes) are very important cultivations.

In many parts of Jugo-Slavia minerals are known to exist, but, except in Serbia, very little mining takes place.

Belgrade, the capital, is built on high ground at the confluence of the Save and the Danube, a position of considerable importance, since the Danube is a great.

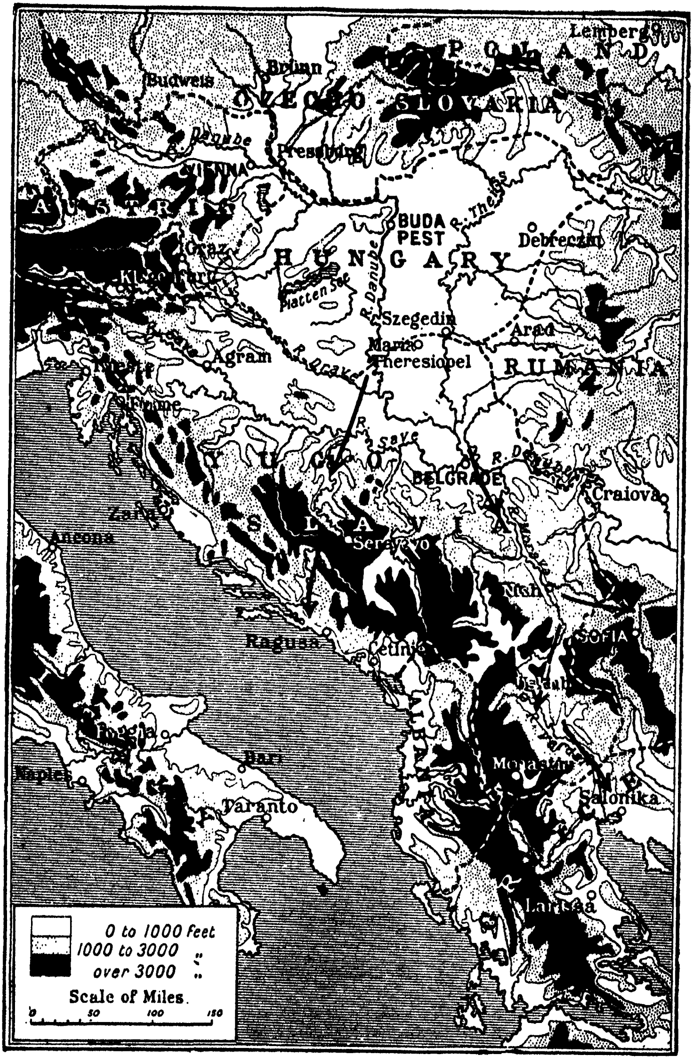

FIG. 84.—Jugo-Slavia.

navigable international river. The city also commands the Orient route to Constantinople via the valley of the Morava. *Nish* stands on the Nishava just before its confluence with the Morava. The Nishava valley carries the Orient route eastwards, whilst the upper Morava and the Vardar valleys lead another line southwards to Salonika. Nish is therefore a very important railway centre. *Uskub,* a very ancient city, stands in the upper Vardar basin and commands the lowest part of the watershed between the Morava and Vardar basins. *Monastir,* the chief town of the highland vilayet of Macedonia, lies in a highland basin, where much grain is produced and pastoral occupations are carried on. In connection with the latter the manufacture of leather finds employment for many. The town is reached by a railway from Salonika.

The chief Adriatic ports are *Spalato* and *Ragusa.* The latter is reached by a railway from Buda-Pest which utilizes the valley of the Brosna, and passes through *Sarajevo,* the chief city of Bosnia, a city which has many claims, especially on the grounds of site, to selection as the capital of the whole country. Although the port of Fiume has been given to Italy, it will be the chief outlet of the northern part of the new country, owing to the fact that it already has excellent means of communication by rail with the interior. Serbia has also been given, by Greece, a free zone in the harbour of Salonika.

The great mass of the people of this new country are Slavs (akin to the Russians), and the majority of them are agriculturists who own their own land. In the past their differences in religion, language, etc., have been too great for them to combine, but now the opportunity is theirs, it is to be hoped that under the leadership of Serbia they will use it to develop a strong and sturdy state, for there appears to be sufficient common feeling of nationality for this. The Slavs have great gifts for co-operation; one of their drawbacks in the past has been a lack of initiative.

ALBANIA.

This country was proclaimed independent in November 1912. Along the coast there is a narrow plain, but the greater part of the country, like Montenegro, consists of a stony, limestone karst highland, where few trees are found, and where the rearing of cattle and sheep is the only important occupation. Long centuries of neglect and misgovernment have produced a land with few good roads or bridges, with no railways and very little foreign trade. Even where agriculture is carried on—*e.g.* along the coast—the methods employed are exceedingly primitive.

The chief port is *Durazzo*. *Scutari,* to the south of the lake of the same name, is the largest town, and *Tirana* is the new provisional capital.

The People of Albania.—Owing to their isolation and the difficulty of access to their country, the Albanians enjoyed practical independence long before it was finally recognized. They are a warlike race, who give themselves a name which means "rock-dwellers," and, even if tribal feuds, which appear to be deep-rooted institutions, have prevented them from developing a real national spirit, there is nevertheless an Albanian nation whose assimilation has been attempted by many conquerors, but always without success. Two-thirds of the people are Mohammedans, and of the remaining third, those living in the north are Roman Catholics, those in the south adhere to the Greek Church. The total population numbers just over one million.

GREECE.

As a result of the Great War, Greece made considerable territorial gains at the expense of Turkey and Bulgaria. To Turkey she has since lost Eastern Thrace and her eastern boundary is now the Maritsa river. We have already noted the chief features of the relief and climate of Greece. Let us now take each of the regions in turn.

Western Thrace.—The plains of Western Thrace have the typical Mediterranean climate. Harvests of wine, tobacco and grain are secured, but the region is backward and little developed. Dedeagach, a little west of the mouth of the Maritza, is the only port of importance.

The Macedonian Region has rich agricultural lowlands producing maize, wheat, cotton, tobacco and olives, but the methods used are very backward, and there are still large areas of malarial swamp lands. Its highland portions are believed to be rich in minerals, but mining is not important. *Salonika,* the chief town and port, stands at the head of the Gulf of Salonika, east of the unhealthy lowlands at the mouth of the Vardar. It is where the great Belgrade–Nish–Uskub–Salonika route reaches the Mediterranean. The port is also connected by railway with Monastir, Athens and Constantinople. It has a considerable trade which is chiefly in the hands of Jews.

The Plains of Thessaly produce the crops of Macedonia but in greater quantities, for they are the chief agricultural areas in the country. Wheat and tobacco are the chief crops, most of the tobacco being exported to Alexandria and Cairo for manufacture into Egyptian cigarettes. *Volo* is the largest town and chief port.

Central Greece is largely a highland area, noted for the rearing of sheep, goats and pigs, but even here the agriculture of the small plains is of prime importance. It is very rich in minerals, and lead, iron, zinc and marble are all obtained in small quantities. *Athens,* the capital of Greece, stands about six miles from *Piræus,* its port. The modern city is built on the plain surrounding the Acropolis, the great rock on which the ancient city stood. Piræus is a prosperous port—the chief in Greece—with growing textile and engineering trades.

The Morea is the peninsula south of the Gulf of Corinth. Here, too, agriculture is the chief occupation, and the leading product is the small, black, seedless grape, which when dried is called the *currant,* a name which is a corruption of Corinth. The chief districts engaged in the production of currants are the north and west coastlands, and so important is this one crop that it is easily the leading export of the whole country. Pastoral occupations are followed in the hilly interior. *Patras,* at the entrance to the Gulf of Corinth, is the chief port of the Morea. It is largely occupied in the currant trade. *Corinth* is now a very small town on the narrow isthmus of the same name. A canal has been cut through the isthmus, and this may help to bring back to the town a little of its former greatness, although it is unfortunate that the canal cannot accommodate large steamers.

The Isles of Greece number hundreds. *The Ionian Isles,* which were formerly British, rise above a submerged platform extending seawards from the western coast. All produce the currant, whilst *Corfu* is noted both as a winter resort and for the excellence of its olives. *Crete* is a large, long, narrow, mountainous island. Its narrow plain and terraced hill-sides produce all the Mediterranean fruits and cereals, whilst its pastures support numbers of cattle, sheep and goats. The island has had a stormy history, and did not come under the full control of Greece until 1913. Its capital is Canea, but Suda Bay, which is quite close, is the best harbour. *The Cyclades* are a group of rocky islands east of the Morea. They are the highest parts of submerged mountain chains. Most of them are bare and unproductive, but a few export wine and fruits. Iron ore is obtained in Seriphos, sulphur and manganese ores in the volcanic island of Milos, whilst the white marble famed for its use in statuary is still obtained in Paros. *Eubœa,* or *Negropont,* is the long, narrow island lying off the east coast of central Greece. Its fertile soil yields Mediterranean produce, but it also exports marble and magnesia. Near Chalcis the island comes so close to the mainland that a bridge has been built across the narrow strait between them. *The Sporades,* or scattered islands, lie north-east of Eubœa. The chief commercial centre of the Ægean Archipelago is *Hermopolis,* on Syra, one of the Cyclades.

The Peoples of Greece.—The ancient Greeks reached an exceedingly high standard of civilization. The many fertile plains isolated from each other by mountain barriers, across which there were few passes, helped the organization of a number of independent city states, whose chief means of intercourse was by the sea. Thus, the habit of the sea was ingrained, and settlements were established westwards as far as Marseilles, southwards at Alexandria, and eastwards at Byzantium (Constantinople) and Odessa. The modern Greek speaks a language which is a corrupt form of classical Greek, and like the ancient Greek he is at home on the sea. In modern times he is the chief carrier of the Levant, whilst as a merchant he may be found not only in all the ports of the Mediterranean and Black Seas, but in most of the great ports of Western Europe. He usually engages in trade in Mediterranean products of one kind or another.

BULGARIA.

Bulgaria consists of alternate belts of highlands and lowlands running east and west. Between the Balkans and the Danube there is a limestone foreland. As we have already seen, this part of the peninsula has an extreme climate, whose very warm and dry late summer is excellent for the cultivation of wheat and maize, the leading crops. Pastoral occupations are also important. This belt is succeeded by the forested Balkans, which are higher in the centre and west than in the east. South of the Balkans lie the plains of Eastern Rumelia, which lie in the upper basin of the Maritza and its tributary, the Tunja. Communications between the lowlands on either side of the Balkans follow three main routes: (i) from Sofia by means of a railway following the valley of the Isker, (ii) by road over the Shipka Pass near the centre of the Balkans, and (iii) along the east coast. Eastern Rumelia is a Mediterranean region, producing wheat, wine, fruit, tobacco, and even rice. The cultivation of roses for the manufacture of the famous scent, attar of roses, is extensively followed on the hill slopes, and particularly in the neighbourhood of the Shipka (= Wild Rose) Pass. The annual yield of roses was formerly from twenty to twenty-five million pounds, but the production of rose oil is now less important. It takes 200 lb. of rose petals to obtain 1 oz. of extract. The pasture-lands of Eastern Rumelia support large numbers of cattle and sheep. The Rhodope Mountains separate Eastern Rumelia from the coastal plains bordering the Ægean Sea. They are little known, almost inaccessible, and compel all communications between the coast and the upper Maritza basin to follow the line of the Maritza valley. The coastal plains now belong to Greece.

Sofia, the capital, stands in the basin of the upper Isker, at a very important position for the command of several routes. The main Orient-Express route from Nish passes through it on its way to the Maritza valley, whilst routes from the Danube, via the Isker, and from the Struma valley also converge upon it. *Philippopolis,* on the Maritza, the chief centre of Eastern Rumelia, stands in a region of great fertility. *Varna,* the chief Black Sea port, is becoming a manufacturing centre, especially of cotton. Here it may be noted that Bulgaria has at present few manufactures, but in recent years industries have sprung up in different parts of the country. A beginning has also been made in the development of the mineral resources. *Rustchuk* is an important river port situated where the railway from Bucharest to Varna crosses the Danube.

The People of Bulgaria.—The Bulgarians are of mixed Slav and Mongol, that is, of mixed white and yellow, extraction. Their country was formerly inhabited by Slavs of the same race as the Serbians. In the eighth century, Mongols of the same race as the Finns and the Magyars entered the peninsula by the north-east gateway, conquered the original Slav inhabitants of Bulgaria, and settled amongst them, with the remarkable result that they adopted both the Christianity and the language of the conquered Slavs. The Bulgar has not only the genius for co-operation and the devotion to agriculture shown by the Serb, he has also the Mongol characteristics of tenacity, perseverance and patience. Even the clothes, food and household utensils of large numbers of Bulgars suggest Mongol steppe conditions. Both men and women wear sheepskin jackets in winter, boots are made of raw hide, many houses are of wattle and daub, beds are usually piles of coverlets and woollen rugs made by the women, bagpipes are the common musical instruments, and milk and flesh foods the chief diet. There is a long-standing feud between the Serbs and the Bulgars.

THE REPUBLIC OF TURKEY.

Of all the former vast European possessions of Turkey all that remains is the small peninsula east of the lower Maritza, whose most important areas are the plains of Eastern Thrace. In some parts of these plains wheat and Mediterranean fruits are grown, but over most of the area the land is so dry that steppe conditions prevail and pastoral occupations are more important than agriculture. *Adrianople,* the chief city, stands at the confluence of the Maritza and the Tunja. It has an important silk manufacturing industry.

Istanbul (Constantinople) is built on both sides of the Golden Horn, an arm of the Bosphorus, and also on the Asiatic side of the straits. The Turkish part of the city lies south of the Golden Horn, which separates it from Pera, where most Europeans reside, and Galata, the business quarter. Scutari is that part of the city lying on the Asiatic shores of the Bosphorus. Istanbul commands two great routes, that from Asia to Europe, and the sea route from the Mediterranean—via the Dardanelles, the Sea of Marmora and the Bosphorus—to the Black Sea. At Istanbul the straits are only about a mile wide, about two miles further up towards the Black Sea they are narrower still. It is almost certain that had the city been in the possession of one of the more advanced European nations, the straits would have been either bridged or tunnelled, thus giving through communication between the railways of Europe and South-west Asia. One disadvantage, however, is the fast current which flows from the Black Sea through the narrow passages leading to the Ægean. Istanbul is no longer the Turkish capital. Its place has been taken by the more centrally placed city of Angora in Asia Minor.

The Treaty of Lausanne (1923) provides that a zone on either side of the boundaries between Turkey on the one hand, and Greece and Bulgaria on the other, must be demilitarized. The same applies to the Dardanelles, the Bosphorus and to the island groups at either end of the former.

The People of Turkey.—The Turks are Asiatics, who entered the peninsula from Asia Minor in the fifteenth century. They never assimilated the peoples whom they conquered, partly owing to difference of race, partly owing to difference of religion, for the Turks are zealous Mohammedans. The Turk is a good fighter and is noted for his warlike qualities, but he is not a good ruler of subject races.

BRIEF HISTORICAL OUTLINE.

The Turks entered the Balkans in the fifteenth century, and, except for Montenegro, soon conquered the whole peninsula and swept along the Danube towards the heart of Europe, as well as along the north coast of the Black Sea. They captured the Hungarian plains, but Vienna never fell to them. In the seventeenth century the retreat began, and most of the Hungarian plains were lost. In the eighteenth century the territory east of the Dnieper and the remainder of the

Hungarian plains were torn from their grasp. The nineteenth century saw the freedom of Bosnia, Serbia, Rumania, Bulgaria and Greece. In 1912 the Balkan League (Serbia, Bulgaria, Greece and Montenegro) fought Turkey and drove the Turkish armies behind the lines of Chatalja. Unfortunately they then quarrelled about the division of the spoil, and Serbia, Greece and Montenegro fought Bulgaria, whose ruler said he would get his demands by the sword. However, Rumania came in against Bulgaria, and the latter country was forced to submit. Meanwhile the Turks slipped out from behind the Chatalja lines and reoccupied Adrianople, which they had previously lost. At the peace which brought hostilities to a conclusion not only was a new country created, *i.e.* Albania, but every Balkan country gained territory, chiefly at the expense of Turkey (but note that Rumania increased her Dobrudja territory at the expense of Bulgaria), so that the Sultan's European dominion was reduced to the lower Maritza valley and the Constantinople peninsula. On account of this gradual shrinking of the Turkish European possessions the Sultan was known as the "Sick Man of the East."

The outbreak of the Great War in 1914 found most of the Balkan countries discontented with their recent gains. The Serbians were hungering for an enlarged Serbia which should include Bosnia and Herzegovina, and have an outlet to the Adriatic. Montenegro longed to regain Scutari, which had been won during the last war; Bulgaria was smarting under her defeat, and was particularly angry with Serbia and Rumania, whilst the latter country looked forward to the possession of Transylvania, where three millions of Rumans live. Turkey appeared to have found a friend in Germany, and looked forward to the opportunity of regaining some of her lost territory, and of gaining a tighter grip on her Asiatic possessions.

Perhaps the ideal state of affairs would be to make the boundaries of the various states coincide with racial frontiers, but this is impossible. The different nations are mixed, especially along the marginal areas between the different states. In Macedonia, whose possession is disputed by Bulgars, Serbs and Greeks, there is not only no Macedonian race, speech or region, but there is not even one dominant race, speech or religion. The population is composed of Turks, Greeks and Bulgars in about equal numbers, and all of them speak two languages, and very frequently three. The sole desire of the Macedonian peasant is to be left alone. If you ask him what race he belongs to, he invariably replies, "I am a peasant."

Finally, the trade of the Balkan countries is relatively very small; indeed the real commercial development is in its infancy. And it cannot grow until more settled government prevails, until better means of communication are built, and until the general standard of the people's intelligence is considerably raised so that modern methods can take the place of the very antiquated processes employed in many occupations.

EXERCISES.

1. On a physical map of the Balkans indicate the main lines of communication. Add notes on their connection with the relief.
2. Where, and under what conditions, are each of the following industries followed on a large scale: wheat growing; tobacco growing; pig rearing; cattle rearing?
3. Give the position and state the importance of Constantinople, Belgrade, Sofia, Nish and Patras. Draw sketch map to illustrate your answer (see Figs. 67 and 82).
4. Comment upon the new Balkan frontiers. In which cases do you think they make for permanence and the building up of strong countries, and in which do you think there are the possible seeds of future conflict?
5. What are the big outstanding facts of the relief, climate and economic development of the Balkan peninsula?
6. "The new boundaries of the enlarged Serbia necessitate a corresponding adjustment of the railway system, which in the former Austro-Hungarian monarchy centred on Vienna and Buda-Pest. An east to west system and the extension of port facilities on the Adriatic are now essential." Discuss this statement.

CHAPTER XXXIX.

FRANCE.

PHYSICAL FEATURES.

FRANCE has a triple outlook to the sea. On the north she has access to the English Channel and the North Sea, on the west to the Atlantic, whilst in the south she has a "window" looking out upon the Mediterranean. In having an outlet to the Mediterranean she has a great advantage over sea-girt Britain, but she has had the disadvantage of having the least safe part of her land frontier in common with Germany, from whom she has had most to fear, and from whom she so profoundly differs.

Fig. 85 shows the pre-war north-eastern frontier of France. The principal direct routes between France and Germany are via the Burgundian Gate, the Gap of Zabern and the narrow valley of the Moselle. The two fortress curtains of France, the first from Belfort to Epinal, the second from Toul to Verdun, more or less command these gateways. Of course fortresses built above the ground do not form insuperable barriers to the progress of a modern army, owing to the high explosive force of modern shells, but, on the outbreak of the Great War, the German plan was to crush France suddenly, to give her a knock-out blow at the very commencement of the war. Thus the fall of Paris was aimed at as the prize of the first month's fighting. This would be impossible from the east, not only because of the fortress chain mentioned above, but also because of the successive scarpland barriers of eastern France which form excellent defensive positions. Therefore the crime of crossing Belgium and Luxemburg was perpetrated, since only by violating the neutrality of those states, especially of Belgium, could large forces be moved with rapidity.

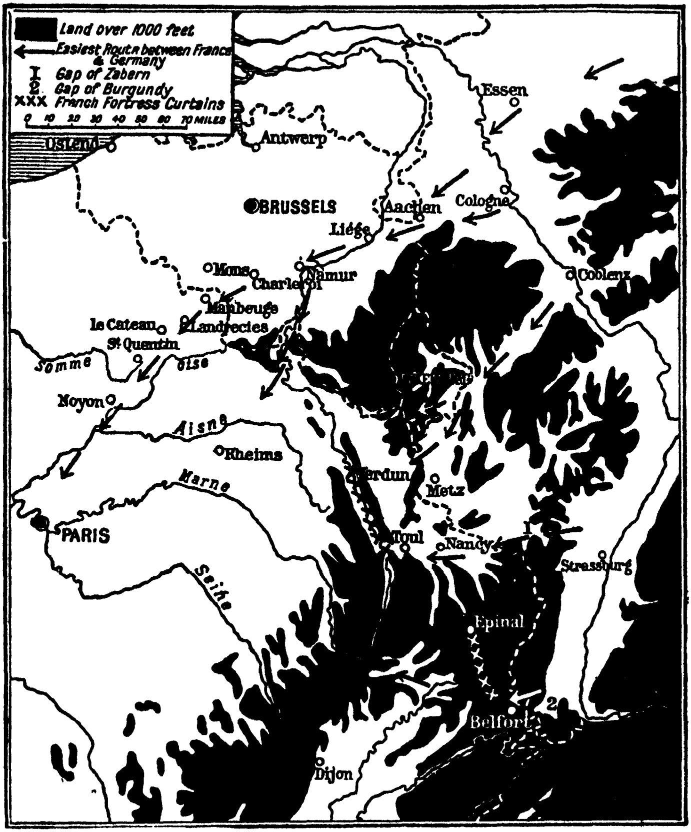

FIG. 85.—The North-eastern Frontier of France in 1914. Compare with Fig. 74.

Fig. 74 shows the new eastern frontier of France. The French claim to Alsace and Lorraine was undoubtedly right, but from a purely military standpoint her new frontier, the Rhine, is less safe than the line of the Vosges, hence the special precautions which have been taken. But it is to be hoped that the formation of the League of Nations will bring about better international feeling and that France and Germany, and all other nations, will in future seek brotherhood rather than war.

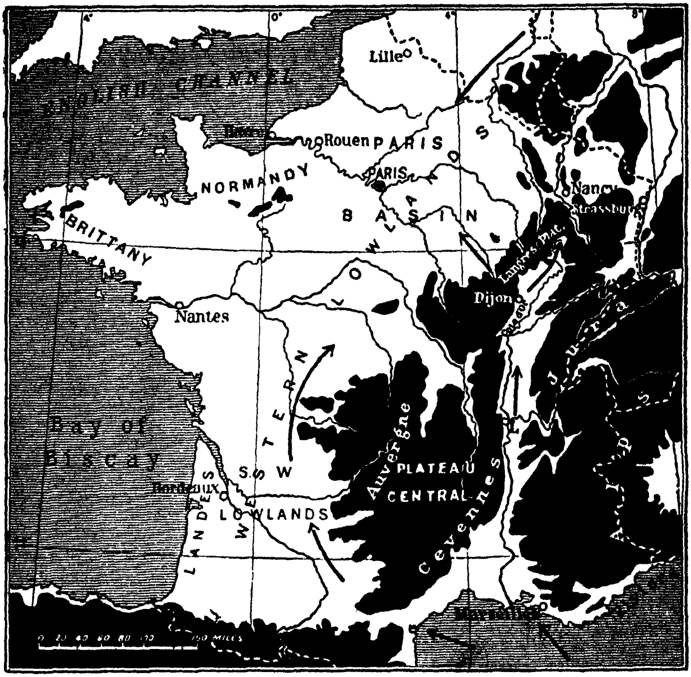

Fig. 86.—The Relief of France.

From Spain and Italy, countries with whom she has many things in common, France is cut off by high mountain walls.

The relief and structure of France are somewhat complicated, but may be broadly treated under the following divisions: (1) the Pyrenees and the Alps; (2) the Central highlands; (3) the Southern, Western and Northern Lowlands.

1. *The Pyrenees and the Alps.*—These high, folded ranges, once part of a continuous system, lie along the Spanish and Italian frontiers (see pp. 388 and 397). Between the maritime Alps and the sea is the beautiful Riviera, famous for its winter health resorts, *e.g.* Nice, Cannes and Mentone (see Fig. 86).

2. *The Central Highlands* include (1) the extensive plateau lying between the Rhone and the Garonne, (2) its lower north-eastern extensions, the Côte d'Or and the Plateau de Langres, (3) the Vosges, and the Jura mountains, which lie on the Swiss frontier. All these form part of the great central European belt of highlands (see Fig. 59).

The central plateau of France is the core of the country. It consists of an ancient crustal block which has been faulted and tilted so that it presents a very steep and regular escarpment to the Rhone valley and a gentle slope towards the west. The steep scarp is known as the Cevennes, which look like a great mountain wall if viewed from the valley of the Rhone, but from the west it is approached by gentle slopes. In the north-west of the central plateau, piled up above the general plateau level, there are the extinct volcanic Auvergne Mountains. These mountains include many well-preserved cones, called Puys, beautiful crater lakes, and many mineral springs. Near some of the latter watering-places have grown up. The highest peak, the Puy de Dôme, reaches an elevation of 4,850 feet above sea-level, or about 1,700 feet above the plateau level. Elsewhere the central massif is chiefly composed of limestone, and has areas of karst country, known locally as the Causses, where all the features described in connection with the Dalmatian highlands are to be found. The Tarn, the Lot, and other rivers flowing westwards to the Garonne, are noted for their magnificent cañon and gorge scenery. The poverty of their valleys is in marked contrast to the rich valleys of the Loire and the Allier, which flow northwards. These are filled with rich soil which is largely the accumulated volcanic dust carried by the prevailing westerlies from the Auvergne area.

The Côte d'Or, the Plateau de Langres and the highlands of the upper Meuse form lower north-eastern extensions of the highland of the central region, but are composed of newer rocks. They form the watershed between the Seine and Saône, a barrier which very fortunately can be easily surmounted by road, rail and canal.

The Vosges we have already noted (see p. 329). Between the steep eastern slopes of the Vosges and the Rhine lie the rich alluvial rift-valley lowlands of eastern Alsace and Lorraine which structurally belong to the Central Highlands belt. The Jura Mountains are a series of long, parallel, folded mountain ridges whose tops have been flattened by denudation. They are a great barrier to communications, except along the downfolds between the ridges. Between the Juras and the Vosges is the important Burgundian Gate, which gives access to the middle plain of the Rhine.

(3) *The Lowlands.*—These readily fall into: (1) The Plains bordering the Gulf of Lions, (2) the South-Western Plains, (3) the North-Western Peninsulas of Brittany and Normandy, (4) the Paris Basin, and (5) the North-Eastern Plain.

The low, lagoon-bordered coasts of the Gulf of Lions are in marked contrast to the hilly Riviera coasts of the Gulf of Genoa. The south-western coasts, *i.e.* between the Gironde and the Spanish frontier, are also low and lagoon-bordered. Here the coastal belt consists of the sandy *Landes,* whose sand-dunes, formed by wind-blown sand, are now checked from creeping inland by means of the planting of pine trees and grasses. The forests not only yield timber and turpentine, but also protect the vineyards from the sand-storms which formerly did great damage. The peninsulas of Brittany and Normandy, which may be compared with the south-western peninsula of England, are built of old, hard rocks, whose higher portions stand out as more or less barren and desolate moorlands, but the lowlands are covered with rich soil. The coast of Brittany is bold and rugged and has some splendid harbours. The Paris basin has marked physical resemblances to the great lowland of south-eastern Britain. It is a land of limestone and chalk scarplands and rich clay vales, whose diversity of structure has led to diversity of landscape, soil, natural vegetation and cultivated crops. In the extreme north-east the land adjoining Belgium is very flat, whilst belts of sand dunes are encountered along the coast.

The mountainous island of *Corsica* belongs to France, although in structure, race and language it is Italian. Like Sardinia, it is composed of granite and other ancient rocks. Along the coastlands the products of the Mediterranean type are grown. *Ajaccio,* the birthplace of Napoleon, is the chief town and port.

CLIMATE.

The lowlands to the west, north-west and north of the central highlands have the equable distribution of temperature enjoyed by Western European lowlands open to the influence of winds from the Atlantic Ocean, but the influence of latitude is seen in the warmer temperatures of the south, especially in winter. The rain falls at all seasons, but on the whole, winter is the wettest part of the year. These conditions will be recognized as belonging to the *Western European Type* of climate. The central highlands have a colder climate, due, of course, to altitude, whilst the rain, although falling at all seasons, chiefly occurs in summer. Therefore this part of France is climatically as well as physically a part of the *Central European* region. The sheltered lowlands between the Vosges and the Rhine enjoy higher temperatures than elsewhere in Central France. In the lowlands of the lower Rhone, along the shores of the Gulf of Lions and in the Riviera, the mild, wet winters and the warm, dry summers indicate the *Mediterranean Type* of climate. Thus France includes three types of regions.

THE RIVERS OF FRANCE.

The greater part of France slopes to the Atlantic Ocean and the English Channel. In the north-east the basin of the upper Scheldt, and in the east the basins of the upper Meuse and the Moselle, and the parts of Alsace and Lorraine east of the Vosges, are drained away from France either to Belgium or to Germany, whilst the long, narrow corridor between the central highlands on the west and the Alps and Juras on the east is drained by the Rhone and its tributaries to the Mediterranean.

The chief west-flowing rivers are the Garonne and the Dordogne (which unite to form the estuary named the Gironde), the Loire (the longest French river), the Seine and the Somme.

The *Garonne* and the *Dordogne* derive most of their waters from very different regions, the Garonne chiefly from the Pyrenees, the Dordogne from the central plateau. Notice the large number of valleys opening northwards to the Garonne from the northern slopes of the Pyrenees. These valleys are short and precipitous, and the rivers occupying them are usually torrents. They are, therefore, of little use as means of crossing the Pyrenees. The middle plain of the Garonne is a rich alluvial region which has been called the "Granary of south-west France." The *Loire* and its chief tributary, the Allier, rise in the central plateau and at first flow northwards in parallel valleys of great fertility, but later bend westwards. The plains of the middle and lower Loire basin, *i.e.* that part lying south of the Normandy heights and north of the central plateau, form one of the richest regions in France. It is known as the "Garden of France." Orleans and Tours are its chief centres. The Loire enters the Bay of Biscay by a great estuary. The *Seine* is the most important French river. The main stream and its chief feeders, the Yonne and the Marne, rise in the plateau separating the basin of the Seine from that of the Saône. Except for the Oise, and its tributary the Aisne, all the important feeders reach the main stream above Paris. One result of this is seen in the floods from which Paris has often suffered. The Seine basin is so small that the same meteorological conditions normally obtain over all parts of it. Therefore in times of unusually heavy rains or of melting snow, the waters are concentrated above Paris and the river rises abnormally. Fortunately it is easy to anticipate, and to take precautions against, such occurrences. Below Paris the Seine meanders across its lower plain to its estuary. The *Somme* basin, which is included with the Seine in what is called the Paris basin, is separated from that river by low divides. It is one of the clay vales of the scarplands of the Paris basin. Amiens is at a very important crossing-place of the river at its confluence with the Avre.

The *Rhone* rises, like the Rhine, in Mont St. Gothard. Before entering France it passes through Lake Geneva, which acts as a great filter. At Lyons it is joined by the slow-flowing, clear Saone, its Burgundian tributary, and turns southwards. Further on it receives the Isère, whose head-stream leads to the Little St. Bernard Pass, and at Montélimar enters the typical Mediterranean environment. The Rhone, like all Mediterranean rivers, has a delta, which is rapidly increasing in extent. Unfortunately the Rhone is fast-flowing, and is not very deep, so that it is not of great use except for downstream traffic. Its valley, however, is of enormous value as a route leading from the Mediterranean to the Paris basin.

Now that France once more possesses Alsace-Lorraine her territories reach the left bank of the middle Rhine, the most important commercial river highway of Europe. The navigation of the Rhine from its mouth to the Swiss frontier is free to all nations.

CHIEF INDUSTRIES.

Nearly one-half of the total area of France is cultivated, nearly one-third is pasture land, about one-sixth is forested, and the remainder—about one-fifteenth—is moorland and waste land. In the British Isles less than one-quarter is cultivated. The reasons why there is greater cultivation in France are partly climatic and partly bound up with the present ownership of land. In the first place the higher summer temperature makes it possible to extend cultivation to higher altitudes, whilst the ownership of the land by the peasants themselves means greater interest in agriculture, since each small proprietor will usually cultivate his own possession. The French forests are chiefly in the hill country, *e.g.* Pyrenees, Juras, Vosges, Meuse Highlands, etc., and in the Landes. In the Mediterranean region chestnuts, walnuts and olives are very important, but elsewhere the cool-temperate deciduous and coniferous trees are found. Forestry is an industry which is scientifically carried out. The small extent of waste land is situated in the highest mountains, or in the central plateau and in the higher moorlands of the north-west peninsulas.

Agriculture.—The cultivation of the land is the most important French industry. The largest area is devoted to wheat-growing, which is followed, in order of area devoted to production, by oats, vines, potatoes, rye, barley and the sugar-beet. Hemp and flax, mulberries, olives and tobacco are also important agricultural products.

Wheat is extensively grown in the western and northern lowlands, except in the north-western peninsulas, where the poorer soils and the wetter climate are unsuitable. In France about nine times as much land is devoted to wheat-growing as in the British Isles, but the yield is not nearly nine times as large, for the reason that in Britain practically only the best arable land (in the eastern counties) is devoted to the crop, whilst in France it is grown on various soils, some of which are not so suitable as others. But despite this it should be noted that in the amount of wheat produced, France ranks as one of the foremost countries in the world. The best wheat-lands are in the Paris basin and the middle basin of the Loire. *Oats*, the second cereal, are grown in the same districts as wheat. The *vine* is extensively grown in that part of France lying south of a line drawn from Nantes and passing away south of Paris to the eastern frontier. The yield of wine varies very much from year to year and is influenced by the ravages of insect and fungus pests. The chief French wine regions are the basins of the Garonne and the Dordogne, where the famous claret wines are produced and Bordeaux is the chief centre; the valleys of the Loire and the Allier; the valleys of the head-streams of the Seine, where the noted champagne is produced and Rheims is an important centre; the basin of the Saône, where Dijon is the market for Burgundian wines; the regained provinces of Alsace and Lorraine, and the lower Rhone valley and the Mediterranean region, where the very best wines are produced. *Olives* and *mulberries* are also extensively grown in the last-named region, and have led to the growth of soap and silk manufacturing at such centres as Marseilles and Lyons. *Tobacco* is chiefly grown in the upper Garonne valley, where it is manufactured at Toulouse, and in the Rhine lowlands of Alsace and Lorraine. The tobacco industry is a Government monopoly. In the north-eastern lowlands adjoining Belgium, flax and hemp (also grown in the north-western peninsulas), and the sugar-beet are important crops, and form the basis of linen and sugar-manufacturing industries.

Brittany and Normandy, like south-western England, are more noted for dairy-farming and market-gardening than for corn-growing. Their dairy farms produce large quantities of butter, cheese and eggs for the markets of England as well as for those of northern France. Their market gardens are noted for early vegetables, and their orchards for fruit, for which Normandy in particular is famous. The scarplands of the Paris basin support numerous sheep, whose wool has encouraged woollen industries. Both cattle and sheep are reared in the central plateau region, whilst in most of the rich western plains dairying is carried on.

Summarizing the agricultural and pastoral occupations we see that in northern France, where the climate resembles that of southern England, the products also show a close resemblance. The north-western peninsulas with their dairy-farming, market-gardening and fruit-growing may be compared with south-western England; the Paris basin, with its rich agricultural clay vales and its scarplands, engages in the production of cereals and in the rearing of sheep like south-eastern Britain. To this must be added the beet, flax and hemp of the plains bordering Belgium. In the rest of France the vine is the chief crop, but cereals remain of great importance in the basins of the Loire and the Garonne. Except where their valleys are fertile, the central highlands are of little importance and are chiefly used for the rearing of cattle and sheep, whilst the Mediterranean lands are the best wine lands and also produce olives, mulberries and other Mediterranean fruits.

Mining and Manufacturing.—The mineral wealth of France is inferior to that of Britain, and as a consequence there is less manufacturing. The chief coalfields are in the north-east, in the St. Etienne and Le Creusot districts, and in the Saar basin.

The North-Eastern Coalfield.—This coalfield, which extends into Belgium, is the most important industrial area in the country. Unfortunately the mines are very deep and the coal is difficult to mine, so that the cost of obtaining it is high. Some iron is found locally, but most of that used in the engineering and other iron industries is introduced from Lorraine and from the district of Nancy. The chief textile industries of France are also located on this coalfield. The local flax and wool are insufficient to meet the demands of the linen and woollen mills, so that these raw materials have to be imported. France is unfortunate in not having a colony producing wool. She largely draws her supplies of that article from Argentina. Flax is imported from the Baltic countries. For the cotton mills, raw cotton is imported from the United States, Egypt and India. Fortunately the coalfield is near to the sea, which facilitates the importation of all these raw materials through the port of Dunkirk.

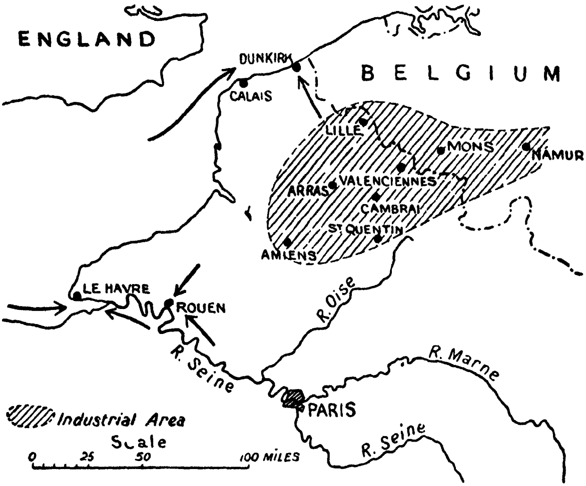

FIG. 87.—The Industrial Area of N.E. France. Note the position of this area on Fig. 79.

Lille, Valenciennes and *Roubaix* are engaged in engineering and textile trades. On account of its iron trades Lille may be described as the "Birmingham" of

France. It has also woollen, cotton and sugar-refining industries. Valenciennes specializes in lace, whilst in Roubaix woollen manufacturing is of greatest importance. *Cambrai* is noted for its linens. *Amiens* and *St. Quentin* are also engaged in textile trades, particularly in the weaving of cotton cloth. *Rouen* is the centre of another cotton manufacturing district, although it is a considerable distance from the coalfield. But it was through Rouen that cotton was first imported, so that the industry got an early start, and the workmen became so skilled that the manufacture was able to continue even when the disadvantages of being away from coal began to make themselves felt.

The Saar-Basin Coalfield—Partly as compensation for the destruction of coalmines in north-eastern France, and partly as payment on account of indemnities, the Treaty of Paris (1919) compelled Germany to cede to the League of Nations the ownership of the coalmines of the Saar Basin (see Fig. 74). At the end of fifteen years a plébiscite to decide whether the inhabitants desire French, German, or League of Nations' control will be taken. There are no very large towns in the basin, for the coal is not so much used to support local industries as for export to meet the needs of a wide area extending even to Switzerland and Italy.

The St. Etienne Coalfield has both iron and coal. Therefore the town has become an important engineering centre. Its nearness to the Mediterranean area has led to the growth of silk manufacturing. This industry, however, is chiefly centred at *Lyons,* the large city at the confluence of the Rhone and the Saône. The local silk supply is supplemented by imports from Italy, which arrive via the Mont Cenis Tunnel, and from China and Japan. Silk from the latter countries is imported through Marseilles.

The Le Creusot Coalfield is also fortunate in possessing iron as well as coal. At Le Creusot there are works engaged in the production of steel rails and locomotives for the state railways, but the town is best known for its ordnance works which manufacture enormous quantities of war materials.

The rich iron deposits of Lorraine have been mentioned above (see also p. 337). *Nancy* is an important

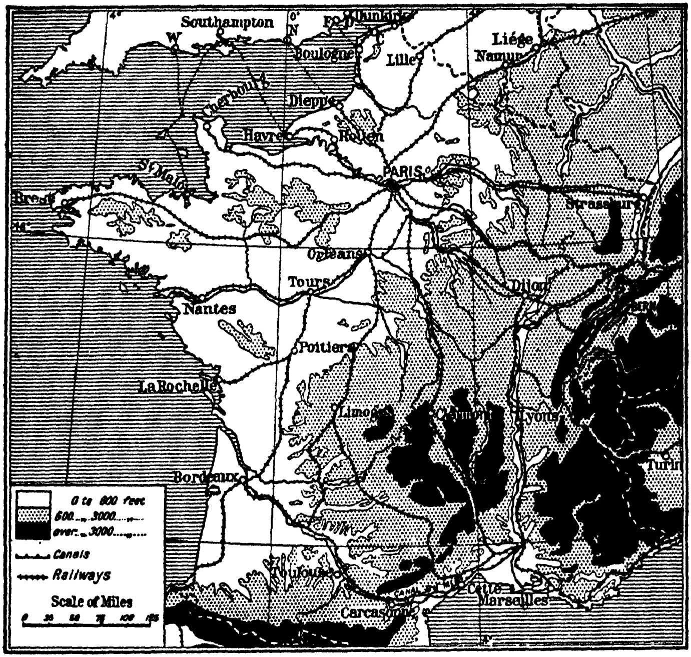

FIG. 88.—France. Communications.

centre for iron and steel trades. The iron wealth of the Briey basin, and the steel works of Longwy, northwest of Metz, are also worthy of mention.

In many towns on both flanks of the Vosges, cotton manufacturing by means of water-power is becoming very important. Belfort, Epinal, St. Dié and Mulhausen are engaged in this industry. At *Limoges,* on the western edge of the central plateau, the presence of kaolin has led to the growth of a porcelain industry finding employment for over 5,000 people.

Fishing.—The chief French fishing ports are on the north coast. The fishing vessels of Fécamp, Dieppe, Boulogne and Dunkirk ply their trade not only in the narrow seas—including Dogger Bank fishing—but even proceed as far afield as Iceland and Newfoundland. These northern ports are the chief markets for cod and herring. The ports of the north-western peninsulas are engaged in sardine, tunny and mackerel fisheries. In western France there are also many fishing ports, of which La Rochelle is the most important. On the south coast the chief fishing grounds lie west of the Rhone, where the shallow seas are of the greatest extent. *Cette* is the centre. The obtaining of salt by the evaporation of sea-water is important along this coast. Such an industry is greatly helped by the nature of the climate.

MEANS OF COMMUNICATION.

The land communications of France converge, in a most remarkable manner, upon Paris (see Figs. 86 and 88). *Paris* grew up just below the confluence of the Seine and the Marne, in the "Isle of France," upon which several river-valleys converge. Fortunately at this point the presence of an island gave an easy crossing as well as a good means of defence. From this island, the Île de la Cité, on which stands the famous cathedral of Notre Dame, the city of Paris grew outwards and outwards, until to-day it has a population of nearly three millions. Owing to the fact that the city is exposed to attack from the north-east and east—the historic fear of Paris—it has always been very strongly fortified, and as it outgrew its ring of fortifications, these were dug up and turned into wide, tree-lined streets, called boulevards. The routes which converge upon the city come from the Channel ports; from the great European plain (Moscow to Paris Line), via the Meuse–Sambre–Oise, whose valleys skirt the edge of the highlands; from Coblenz via the Moselle valley; from Strassburg (Orient–Express Line) via the Gap of Zabern, Nancy and the Marne valley; from Switzerland and southern Germany via the Burgundian Gate; from Switzerland and the Rhone valley via Dijon and the Yonne; from the south and the central plateau via the valleys of the Loire and the Allier; from Spain, Bordeaux and Tours via the western lowlands; and from Nantes and Brest in the west. Most of these routes come from outside the Paris basin. Paris may be compared with London. Both cities have grown up around an easy crossing-place of a river; both stand on navigable rivers which give them access to the sea; both stand at the heart of rich agricultural lands from which they have largely drawn their wealth, and in which they remained until comparatively recent days the only large centres of population. In the case of Paris, even to-day there are no really large towns until the edges of the Paris basin are reached. As regards its industries, it should be noted that Paris, like London, lies away from coal and iron. It is famous for articles of fashion and art, *e.g.* jewellery, millinery, gloves, etc.

Dijon deserves special mention as a railway centre. It lies in the Saône valley, and commands an easy route across the Côte d'Or to the basin of the Seine (see Fig. 88). It is, therefore, the meeting-place of routes from Switzerland via Pontarlier, from Brindisi via the Mont Cenis Tunnel and Chambéry, and from Marseilles via Lyons. The routes Calais–Paris–Dijon–Marseilles and Calais–Paris–Dijon–Brindisi are of great importance in shortening the journey to India, Australia and the Far East.

France has also an excellent system of canals, which supplement the rivers and connect one river-basin to another, so that it is possible to transfer goods from one part of the country to another without break of bulk. The inland waterways are so extensively used that they carry about one-fifth of the total tonnage of the internal trade. Those carrying the greatest tonnage connect the ports of Calais and Dunkirk with the Lys and the Scheldt, and thus with the Belgian inland waterways, and by the help of the St. Quentin canal, with the Oise, which is in turn connected with the Sambre. The Oise and its tributary canals bring supplies of coal to the capital.

The Rhine–Marne canal, which passes through the Gap of Zabern to Strassburg, and the Rhine–Doubs canal, which also reaches Strassburg, but in this case by way of the Burgundian Gate, connect the basins of the Seine and the Rhone with that of the Rhine. Now that France once more reaches the left bank of the Rhine, these canals will become of increasing value. The importance of *Strassburg* (= the Castle by the Road) as a great focus of railways, roads and water routes should be noted very carefully. The Seine and Rhone basins are connected by the Burgundian canal, which joins the Yonne to the Saône and passes through Dijon. The Seine and Loire basins are connected by two canals, the more important leaving the Loire just below Orleans, where the rivers come nearest together. The Canal du Centre, which passes between the Côte d'Or and the central plateau, gives communication between the upper Loire and the Saône, whilst the Canal du Midi, from Toulouse to Cette, connects the Mediterranean with the Atlantic. These canals will be found marked on Fig. 88).

THE COMMERCE OF FRANCE.

France is so largely self-supporting in agricultural products that the industries which employ least people actually appear the most prominent in the trade returns. The chief imports are coal and coke; raw cotton, wool and silk; oil seeds, etc. Clothing and other forms of manufactured cotton, woollen and silk goods are the principal exports. Wine and raw wool are both imported and exported. The imported wine largely comes from the French colony of Algeria; the exported raw wool is sent to

Belgian woollen manufacturing towns just over the frontier, but within the natural hinterland of Dunkirk.

The chief port is *Marseilles,* which lies east of the Rhone delta. The old port, founded by the Greeks, has a small but very safe harbour, whose extrance is narrow and rocky. The modern port extends westwards for about three miles along the narrow coastal plains, above which the town climbs the lower slopes of the hills. Its great importance is due to the fact that it commands the route along the narrow Rhone corridor to Dijon, and beyond to the Paris basin and the northern ports (see Fig. 88. It is thus a great packet-station for the routes to the East. Its chief industries—wine, silk and oil (hence soap-making)—are dependent upon the peculiar products of the Mediterranean region in which it lies; but all of these industries have outgrown the local supply. It imports wine from Algiers, silk from China and Japan, and oil-seeds, palm-oil and copra from the great tropical forest regions of Africa and the East Indies. It is the port for Lyons.

Havre, at the mouth of the Seine, chiefly trades with America and England. It exports butter, eggs, cheese and fruit to England, and receives large quantities of coal in return. From America it receives cotton, wool and copper, but most of the imported cotton goes direct to *Rouen,* a very important river port. In 1932 more vessels were " entered " at Rouen than at any other French port. The vessels " cleared " in the same year were only one-quarter of those " entered." *Dunkirk* is the port for the industrial region in the north-east. *Nantes* and *St. Nazaire* have an important trade in colonial produce, *e.g.* coffee, sugar, etc. *Bordeaux* trades in wine.

The chief French naval stations and Government dockyards are *Cherbourg,* on the north coast; *Brest, Lorient* and *Rochefort,* on the west coast; and *Toulon,* on the Mediterranean. Cherbourg is a very important port of call on the Hamburg, London and Southampton mail and passenger services to the United States.

CONCLUSION.

The greatness of France is partly due to her geographical position. She stands at the meeting-place of two great routes. A physical map shows that the great lowland route from Asia across the central plain of Europe meets in the Paris basin those routes which pass from the Mediterranean Sea westwards and eastwards along the margins of the central plateau (see Fig. 86). Therefore, throughout the story of man in Western Europe, the Paris basin has been the meeting-place of peoples, and therefore of cultural influences from two very different regions, the great plain on the one hand and the great sea on the other. These influences have been assimilated and given a character which is definitely French. Thus, France very early became a light-bearer of culture to others, and particularly to Britain, whose debt to her is very great indeed.

The western and northern plains, the central highlands and the north-western peninsulas, and the Mediterranean region have each contributed their quota to the people of France, for their inhabitants are representative of the three main racial divisions of Europe. The vivacity and artistic temperament of the people of the Mediterranean region, the energy, persistence, endurance and earnestness of the people of northern France have each had a share in the making of the greatness of modern France. We are too prone to estimate the French from ideas, often mistaken, of Paris, as though the metropolis were the mirror of the peasantry—the real nation—for the bulk of the French people are agriculturists. But the activities of the French have not been confined to the land. Frenchmen take naturally to the sea, and the results are seen in the long list of intrepid explorers and navigators of French nationality, in the great part France has taken in the story of exploration, as well as in the extent of her colonial empire. It must not be forgotten that Britain's struggle for supremacy in North America and in India was with France.

EXERCISES.

1. On a map of France insert the 1,000 feet contour line and shade all the land over 1,000 feet in elevation. Indicate by arrows the main routes which lead into France, and show how these reach the Paris basin. Indicate the Gaps of Zabern, Burgundy, Montélimar, Carcassonne, Poitou, and mark the towns commanding them.

2. How may goods be carried by water: (*a*) from Paris to Marseilles; (*b*) from Rouen to Orleans; (*c*) from Lyons to Strassburg; (*d*) from Strassburg to Paris; (*e*) from Bordeaux to Marseilles?

3. Where is the chief industrial region of France? What are the chief occupations carried on there and the most important towns engaged? To what extent have the raw materials to be imported, and through what ports are they introduced? What great military disadvantage has the position of this coalfield?

4. "France is essentially an agricultural country." Test this statement by reference to the *Statesman's Year Book* or other work of reference. What are the chief agricultural products and how is their distribution related to geographical conditions?

5. Compare the northern coastlands of France with those of Southern England. What comparisons do you notice in respect of (*a*) structure and relief; (*b*) harbour accommodation; (*c*) climate and chief agricultural and pastoral products?

6. Draw sketch maps to illustrate the site of each of the following cities: Marseilles, Dijon, Paris, Bordeaux, Lyons (*cf.* Fig. 82).

7. Why is it that France has such a wide range of agricultural and pastoral products as vines, wheat, cider, beet sugar, olives, cheese, flour?

8. Show concisely how the relief of France has been of great importance in the history of the country.

9. Write short descriptive notes on each of the following: The French Riviera; the extinct volcanoes of Central France; Brittany; the Rhone "corridor"; water-power in the French Alps.

10. Show clearly how the life of a peasant cultivator in Brittany differs from that of a peasant in *either* Provence *or* Gascony.

11. Read the account of the Central Plateau given on pages 428-9. Illustrate this by a sketch map in which all the features which are mentioned are clearly indicated—including, of course, the winds, the volcanic areas and the characteristics of the valleys.

12. During the Great War most of the mines and factories in the war zone were devastated. They have now been rebuilt on up-to-date lines with modern equipment. How will this help France, especially in her competition with other countries? Agricultural recovery has been much slower.

13. If you have a *Times Atlas,* examine the plan of Paris. What can you learn from it?

CHAPTER XL

BELGIUM.

GENERAL FEATURES.

BELGIUM is essentially a buffer state, and to this fact it owes its independence. Geographically the little country, whose total area is about twice that of Yorkshire, is also a transition state. Its chief rivers, the Scheldt and the Meuse, rise in France and have their mouths in Holland; its surface, whether coastal plain, central plain, or south-eastern highlands, is an extension of the features of adjoining countries; its coal and iron fields extend into France on the one hand and into Germany on the other, whilst its frontiers are so poor as to give inadequate natural means of defence. The history of the country is largely the history of other countries, for the land has been at different times in the possession of the French, the Dutch, the Spaniards, or the Austrians, whilst its position, just where the central plain of Europe is narrowest, and on either side broadens out to the French and German lowlands, has made it the "Cockpit of Europe." Here, time and time again, the armies of other countries have met and fought out their quarrels.

On physical grounds Belgium can be divided into three distinct regions: (1) the Coastal Belt; (2) the Central Plains; (3) the South-Eastern Highlands.

(1) THE COASTAL BELT.

This is a narrow belt of partly drained land which has recently been formed by coastal gains. Off the

Belgian and Dutch coasts there exists a quiet pocket of water where the rise and fall of the tide are not very high (p. 135). Here much of the débris swept along the coast by the tides or brought seawards by the rivers, collects to form new land. The extent of the gain may be seen when it is recalled that cities like Ypres and Bruges were ports on navigable waterways in the middle ages, when they were at the height of their power, but silting has caused them to be "dead" cities. The coast itself is very poor, and contains no good natural harbours, but its large expanses of sand and the shallowness of the sea have led to the growth of many popular bathing resorts. Along the coast are lines of sand-dunes strengthened, where necessary, by artificial embankments in order to prevent the sea from invading the lowlands behind. In order that these flat lowlands may be drained there are gaps in the system of dunes and embankments. *Nieuport* (= the new port—Ypres is the old port) stands where the Yser enters the sea at the western gap. *Ostend* stands at the east end of the central gap, and *Zeebrügge,* the new port of Bruges, in the eastern gap. Zeebrügge harbour, protected by its famous Mole, is reached by a dredged channel to the open sea. It is connected to Bruges by a canal leading to basins within the latter city. The dredged sea channel, the canal and the basins were of uniform depth (26 feet), but the withdrawal of regular dredging operations during the Great War played havoc with the port. Even before the war it appeared very likely that Nature would overcome the efforts of man.

The poor drainage of the coastal belt makes the land of little value for agriculture, but cattle-rearing and dairy-farming flourish and form the chief occupations, except in the parts where fishing is engaged in.

THE CENTRAL PLAIN.

This is largely the basin of the Scheldt, but it also includes the Campine, a large, sandy, heath-covered tract adjoining, and extending into, Holland. The rich loam-lands of central Belgium constitute the chief agricultural areas of the country. They are in marked contrast to the sterile Campine land, although even there much has recently been accomplished by the mixing of the sand with the clay which lies below, and by the addition of artificial or other manures. The chief products, rye, oats, wheat, beet and flax, resemble those of north-eastern France. Wheat is of less importance in Belgium than in France, and its importance becomes still less as we go eastwards along the great European plain. Oats are largely used in the rearing of horses, for which the district between Ostend and Brussels is particularly noted. Beet and flax provide the materials for sugar and linen manufacturing, but much of the best Belgian flax is exported, and cheaper Russian flax is imported to supply the needs of the mills. Intensive methods of agriculture are practised, this being aided by the fact that the bulk of the people are small holders. The spade is the chief implement used, so that the method is really gardening on a large scale.

Antwerp, the chief commercial centre and port of Belgium, lies on the tidal estuary of the Scheldt. The natural waterways have been supplemented by railways and canals in such a manner that the whole system gravitates towards the mouth of the Scheldt. The estuary of that river is navigable as far as Antwerp for vessels of 7,000 tons. The Scheldt is connected by canals to the Meuse and the Rhine, and this, together with the railway connections, gives Antwerp a great transit trade, especially for goods being exported from, or imported to, Germany. The position of the port with regard to the rich German Ruhr valley industrial region should be carefully studied on the map. Coal has been discovered in the Campine area. Should the deposits prove to be rich and not too difficult to obtain, their development will necessarily increase the importance of Antwerp (see also p. 450). The port has an important shipbuilding industry.

Ghent, at the confluence of the Scheldt and the Lys, and at the tidal limit of the Scheldt, can also be reached by canals from Ostend and Zeebrügge, which converge upon *Bruges,* and by a canal from the estuary of the Scheldt. These cities were of great importance in the middle ages, when Flanders was the chief manufacturing centre in Europe. Bruges has now only about one-quarter of the population it had during the days of its greatness. On the other hand Ghent has so much revived that it is the modern textile metropolis of

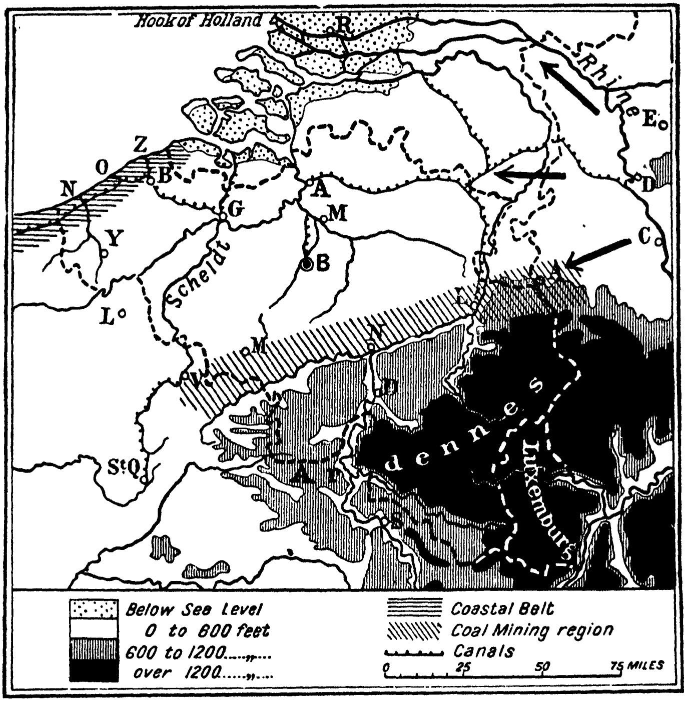

FIG. 89.—Belgium.

Belgium this revival is due to its excellent communications both by rail and water. The ease with which it can import raw cotton via the canal to the Scheldt estuary has led to its becoming the chief cotton manufacturing centre. It also makes linen goods. Its great disadvantage is the absence of coal in the immediate locality. In the upper Scheldt basin linen manufacturing has naturally grown up in the chief flax-producing region. *Courtrai* and *Tournai* are engaged in this industry. Lace-making is carried on in Malines, and also in Brussels, which also manufactures carpets.

THE SOUTH-EASTERN HIGHLANDS.

This part of Belgium, whose area has been increased by the annexation of a small strip of territory including the districts of Eupen and Malmédy, consists of the Ardennes plateau, a portion of the Rhine highlands (see Fig. 81), and of a narrow belt of carboniferous rocks which lie along its north-western margins. The Ardennes plateau consists of very old rocks, and is of small economic value, owing to the sterility of the soil and the severity of the climate. Considerable areas are covered by valuable forests, while efforts have been made to afforest some of the areas which have been cleared of trees in days gone by. The carboniferous belt contains the coal deposits which have made Belgium a busy manufacturing country, and have given it a greater density of population per square mile than any other European country. In both of these regions agriculture is chiefly confined to the valleys of the Meuse and its tributaries, where better climatic conditions are found and where richer soils exist. Fruits, including the vine, and oats are the chief crops, whilst cattle and sheep are reared in the uplands.

The Belgian Coalfields.—Coal is mined in the belt which stretches from Aachen to the middle of the Franco-Belgian frontier. It is mined in three basins separated from each other by intrusions of older measures. In the west the Hainault coalfield is continuous with that of France. The chief mining centre is *Mons.* The Sambre coalfield has *Charleroi* as its mining centre. The third coalfield, which stretches from *Namur* to *Liège,* and beyond into Germany, is the largest in area. Mining is more difficult in Belgium—and also in N.E. France—than is usual on most coalfields, for the seams lie at a great depth, they are thin, highly faulted and contorted, the coal is very hard and the mines are rendered dangerous by fire-damp. The coal from the new Campine field is excellent for coking purposes. This is of first-class importance, for Belgium has to depend upon foreign countries for much of the coking coal so vital for her great metallurgical industries. Some iron is obtained in the Ardennes, but Belgium depends upon Luxemburg and France for the greater part of the iron ore required for her extensive engineering industry.

Liège engages in the manufacture of machinery, ordnance, chemicals, firearms and steel rails. *Namur* has engineering works, but is especially noted for cutlery. Iron-smelting and the manufacture of machinery are carried on at *Mons* and at *Charleroi.* Thus we see that the four chief mining centres are also great centres of iron and steel trades. Liège and Charleroi are also noted for the manufacture of glass, whilst the former has, in addition, large chemical works. Zinc and lead are mined at *Verviers,* which has also a long-established woollen industry, formerly dependent upon the sheep grazed on the Ardennes, but now supplied by wool imported from Argentina.

COMMUNICATIONS.

The surface of Belgium is covered with a network of river, canal, road and railway communications. In a country which is only about twice the size of Yorkshire there are 1,050 miles of navigable waterways (rivers and canals), about 6,000 miles of railway (nearly half light railways), and 6,500 miles of high-grade roadways. The railways and roads are largely state property and are controlled more with a view to the benefit of agriculture and industry than to the making of a profit, and hence the rates both for passengers and goods are remarkably low. *Brussels,* the capital, which lies on the southern margins of the central lowlands, stands on a tributary of the Scheldt. Its central position has made it the focus of the railway communications of Belgium. It does not, however, lie on what is perhaps the most important route through the country, *i.e.* the route from Paris to Berlin, which follows the line of the Oise–Sambre–Meuse, and thus skirts the margin of the Ardennes highlands. Brussels has connections with this route at Namur, Liège and Maubeuge, the latter via Mons. Namur stands at the confluence of the Meuse and the Sambre, and therefore also commands the routes passing along the narrow Meuse valley through Dinant to France. Other routes from Namur and Liège converge upon the city of Luxemburg, and are widely used for the transport of iron ore. Brussels is also in direct rail communication with the ports of Ostend, Zeebrügge and Antwerp—the last-named is continued northwards to Amsterdam—whilst it is brought into contact with Calais by a line which passes through Tournai and Lille.

The Belgian People.

A line drawn across Belgium from east to west, and passing a little south of Brussels, roughly divides the country into two very different structural and economic regions: (i) the agricultural lowlands and (ii) the older rocks of the coal measures and the Ardennes highlands. It also roughly divides the people into two distinct races. North of that line the bulk of the people are the tall, fair *Flemings,* who are closely allied to the Dutch and belong to the Northern race. South of the line are the *Walloons,* a shorter and darker people, who belong to the Alpine race. The Flemings, who are rather conservative in principles, and are very deliberate in thought and in action, speak Flemish, which is akin to Dutch, whilst the more progressive and independent Walloons speak French. The bond which has kept these two very different peoples together is a religious one, for both Flemings and Walloons are Roman Catholics. It is this bond which has caused the Flemings to ally themselves with the Walloons rather than with the Protestant Dutch. The presence of two languages also accounts for the fact that the names of many towns are commonly given in both forms, *e.g.* Antwerp and Anvers; Mechlin and Malines, etc.

We have already pointed out that the history of Belgium is largely bound up with that of other countries. The broad outlines of Belgian history can be seen in that of its towns. Cities like Bruges, Ghent and Ypres, with their cloth halls, their city halls, their guild houses and their nunneries, are representative of the middle ages, when they were the richest and most prosperous woollen manufacturing cities, not only in Flanders but in the whole of Europe. Antwerp came into prominence with the Age of Discovery, and is a type of the commercial prosperity which the newly discovered lands brought to western Europe. In Liège and Mons we have types of the industrial developments of the nineteenth century, whilst in all ages Brussels has been a capital city, Louvain the leading intellectual centre, and Malines the chief ecclesiastical city.

LUXEMBURG.

The northern part of this tiny state forms part of the Ardennes plateau, the south a part of the Lorraine plateau. Most of the people are engaged in pastoral and agricultural occupations. Agriculture is carried on in the valley of the Moselle, where the vine is extensively grown. Southern Luxemburg is noted for its great stores of iron ore, which is extensively mined and exported to Belgium and to Germany.

The little land is a Grand Duchy. Its neutrality, integrity and independence were declared and guaranteed by the Great Powers, but unfortunately it lies on the Moselle route from the Rhine to north-eastern France, and these guarantees, like those of Belgium, proved to be "scraps of paper." The commercial affairs of Luxemburg were formerly controlled by the German Zollverein, but by the Peace of Paris (1919) Germany renounced all treaties and conventions with the Grand Duchy. An economic union between Luxemburg and Belgium came into force in 1922. It is for fifty years and provides for the disappearance of customs barriers between the two states, and for the use of the Belgian currency in the Grand Duchy.

EXERCISES.

1. Divide Belgium into small physical units, and show how the physical conditions have affected the economic development of each.
2. In the early days of the Great War the names, Liège, Namur, Charleroi, Mons, Maubeuge, St. Quentin came successively into great prominence. Why was this?
3. Why is it that the bulk of the trade of Belgium is carried on through the port of Antwerp? Why has Antwerp a large transit trade for Germany?
4. Why is it that Belgium both imports and exports large quantities of wool, flax, coal, wheat?
5. How do you account for the presence of two distinct peoples in such a small country as Belgium. What are their chief differences? How is it that they have held together so well despite these differences?
6. Why is it that Belgium is one of the most densely peopled countries in the world? Where is there special concentration of the people?

CHAPTER XLI.

HOLLAND.

PHYSICAL FEATURES.

HOLLAND, or the Netherlands (*i.e.* the hollow or the low lands), has an area of 12,600 square miles and a population of about 8,000,000. It is thus larger than Belgium, but has a smaller population. Like Belgium it is a buffer state, or rather, with Belgium it makes a combined buffer between the north German plain and northern France. Physically it is largely the combined delta of the Rhine, Meuse and Scheldt, and that is why so much of the country is very flat. Fig. 90 shows that about one-fourth of the country is actually below the level of the sea, whilst as large a proportion as three-fifths is less than 16 feet above sea-level. The low-lying lands are protected from the sea by natural sand-dunes or artificially constructed *dykes,* which are found along the whole length of the coastline. Dykes have also to be built to contain the rivers, which would otherwise flood the low land. The dykes are from 30 to 50 feet high and are usually so broad that main roads are found running along their tops. The care of these embankments is a matter of great importance, and no pains are spared to keep them in good repair, even to the extent of the making of regulations protecting storks and other birds which destroy burrowing animals. The Frisian Islands mark a former coastline, which was breached by the thirteenth-century inundations which led to the formation of the Dollart Zee and the Zuider Zee (= South Sea). Much of the low-lying land of Holland has been reclaimed from the sea by the work of man, and ambitious schemes for the reclamation of part of the Zuider Zee are now being carried out. The procedure followed is to impolder, or build dykes or embankments out in shallow water, and then to drain. The name *polder* is given to the land thus won from the sea. The task is difficult but not insuperable, since large areas of the Zuider Zee are very shallow. A total area of 815 square miles is to be reclaimed, leaving in the centre a freshwater lake with access to Amsterdam. It is expected that some 250,000 people will find ample support on the new lands (see Fig. 90). Large areas have already been

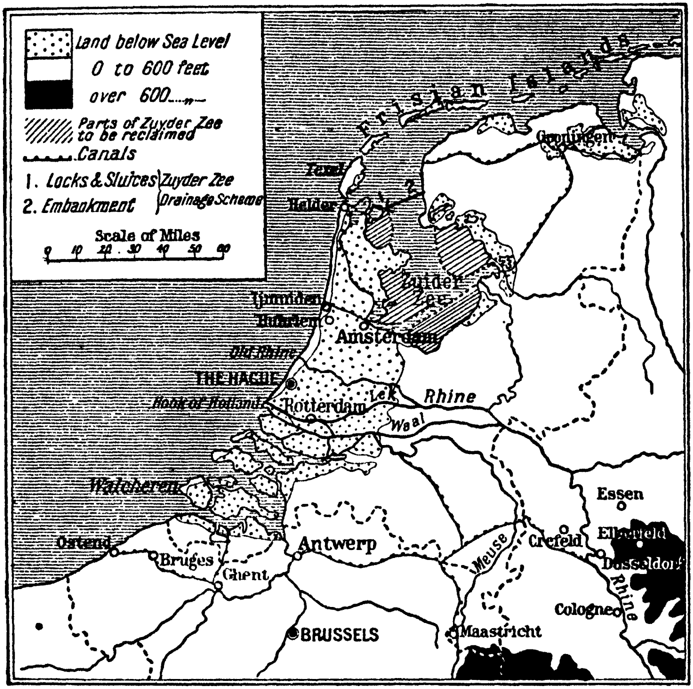

FIG. 90.—Holland.

reclaimed, and cattle and crops are now being raised on fields which were sea bottom a year or two ago.

We have stated that Holland is largely the deltas of the Rhine, the Meuse and the Scheldt. Of these the Rhine is by far the most important, on account of the great load of rock waste which it carries to its mouth. But why does this débris collect and form a delta at the mouth of the Rhine, when on the opposite English coast the Thames rock load does not so accumulate? Off the Dutch coast there is a constant state of relatively high water, and hence a relatively "quiet pocket" is created in which deltaic materials, partly brought down by the river, and partly brought by the tides, can collect, but off the mouth of the Thames the marked tidal phenomena render delta-building impossible (see p. 135). It must not be assumed, however, that no silt is carried away by tides, for this is not the case. The estuaries of Zeeland (south-west Holland) are largely kept clear by the scouring influence of the tides. The Rhine soon after entering Holland divides into two main distributaries, the Waal and the Lek. These are its present main delta streams, but older streams found their exits to the sea via Leyden and the Zuider Zee.

Eastern Holland is higher than the western half of the country. In the north-east, in the district south of Groningen, there are hills of gravel and sand rising to heights of from two to three hundred feet. South and south-east of the Zuider Zee, except for the clay belts along the Lek, Waal, Meuse and Ijssel, sandy lands extend into Germany on the one hand and into Belgium on the other. The sandy region adjoining Belgium is part of the Campine. In the extreme south-east, where the frontier makes a peculiar extension between Liège and Aachen, the land attains an elevation exceeding 1,000 feet. This extension reaches the carboniferous belt and contains some coalmines.

CLIMATE.

The climate of Holland may be compared with that of Denmark. The summer temperatures are slightly higher than in eastern England, and the winters are several degrees colder, so that, for example, skating on the frozen rivers, lakes or canals is more common in Holland than in England. The rainfall is very evenly distributed owing to the flatness of the country, and varies from 20 to 30 ins. It is highest along the coastal dyke and dune belt. The winds, whether the prevailing westerlies or the frequent cold east winds of winter, blow across Holland with remarkable steadiness, a factor which greatly facilitates the drainage of the polders by means of windmills. The typical scene in western Holland comprises flat land, straight roads and field boundaries, canals, windmills and cattle.

CHIEF OCCUPATIONS.

Holland is essentially an agricultural and pastoral country, for except in the small south-east portions, where over 12,750,000 metric tons of coal were mined in 1932, and in districts where clay suitable for the manufacture of pottery is found, there are practically no minerals or even building stone. This is a great disadvantage, for it means that large quantities of road and dyke making materials have to be imported at very considerable expense. The smallness of the mineral wealth has also compelled Holland to take a far less important position in the modern world than she held before the rise of great manufacturing industries based on coal and iron.

About one-quarter of the country is uncultivated. The barren, heath-covered, sandy lands adjoining Belgium, the boggy lands of North Holland, or Friesland, and the high fens along the German frontier account for most of this. Nearly three-quarters of the country is pastoral or arable land, the pastoral land having the greater area. Only about one-thirtieth of Holland is forested, so that timber has to be imported.

There are considerable differences between the farming occupations of western and eastern Holland, differences which are due to the fact that in the west the soils are largely alluvial and heavy, and have been reclaimed from the sea, whilst in the east the prevailing soils are light and sandy. In the west only the surface soil can be properly drained, but in the higher east the drainage difficulty does not occur. Therefore in western Holland dairy-farming (including, of course, the production of butter and cheese), the rearing of horses, especially of dray-horses, and the cultivation of flax, tobacco, flowers, and root-crops form the chief occupations. In eastern Holland sheep are more important than cattle, and rye, oats, wheat, beets and potatoes are the chief products wherever the soil is suitable for cultivation. Rye and oats are far more important than wheat, which decreases in importance the further east we go. As in Denmark the dairy industry is largely controlled on the co-operative plan. The rich saltish grass of the polders is exceedingly good for cattle and results in a high yield of milk. The chief centre for bulbs and flowers is Haarlem, where both sandy and clay soils are found, and the horticultural industry is carried on on land which was once the bed of the Haarlem Lake.

The chief manufactures of Holland are either related to the agricultural products or based on articles imported from the Dutch colonies. Thus the cultivation of flax is associated with the manufacture at Haarlem and other centres of the cloth known as *brown holland,* and with the making of linen goods at Tilburg in South Holland. Hollands gin is distilled from rye at Rotterdam; in several towns in Zeeland and North Brabant there are factories for the manufacture of beet sugar, whilst in Amsterdam and other towns tobacco is manufactured, but in this case most of the raw material is imported from the colonies. The chief Dutch colonies are in the East Indies, and Amsterdam and Rotterdam are the great markets for their products, which include cinchona, cocoa, tobacco, cane sugar and molasses. Based upon these

Colonial imports, quinine, chocolate, tobacco, sugar and distilling industries have sprung up and find employment for large numbers of people. At Delft and the Hague pottery industries have developed owing to the suitability of the local clay. Amsterdam is the chief European centre of the diamond-cutting industry, an industry which shows a link with the former Dutch interests in South Africa. Some cotton and woollen manufacturing is carried on at places like Amsterdam and Utrecht, but comparatively few people are employed, for, except at Maastricht in the south-east, where woollen manufacturing is engaged in, there are few natural advantages which favour textile industries. On the other hand, the huge factories for electric light bulbs and wireless apparatus at *Eindhoven* and *Venlo* are conveniently near to coal and the glass sands of the Campine land (p. 447).

Fishing is a very important industry in Holland, and had a great deal to do with the training of those sailors who laid the foundation of Dutch Colonial greatness and foreign trade. It is interesting to note that the island fishermen are chiefly engaged in the catching of flat fish, which are obtained in the shallow waters near the coast, in the river estuaries and in the Zuider Zee, whilst the deep-sea fisheries are largely conducted from Ijmuiden.

MEANS OF COMMUNICATION.

One of the most important points in connection with the communications of Holland is its position with regard to Germany, and particularly to the Westphalian industrial region. Holland controls the mouth of the Rhine, and this river is the best means whereby raw materials from abroad can reach Westphalia. It is also its best and most direct outlet. The result of this is seen in the enormous transit trade enjoyed by Holland. In normal years this has exceeded 15,000,000 tons per annum. The leading imports of Holland are cereals and flour, iron ore, iron and steel goods, textiles and copper. These are also the chief exports. From what we have learned of the natural resources of the country it is obvious that these statistics indicate a large transit trade.

The principal railways of Holland are also those which place the Dutch ports into communication with German cities. *Hook of Holland* is a packet station, from which an important line runs via Rotterdam and Hanover to Berlin. The route London–Harwich–Hook of Holland–Rotterdam–Berlin gives the shortest journey between London and Berlin. Lines from the Hague—the seat of government—and Amsterdam join this route before it reaches the Dutch frontier. Amsterdam and Rotterdam are also connected by rail to Antwerp, and therefore with the railways of Belgium and France, while a line traverses East Holland from Maastricht via Arnhem to Leeuwarden and Groningen.

Flushing, on the island of Walcheren, is another important packet station with English and Central European connections.

In addition to the Rhine, which is the chief waterway, and to the navigable estuary of the Scheldt, there are several canals deserving of special mention. *Rotterdam,* the chief Dutch port, is reached by large steamers, not by means of the Lek on which it stands, but by a canal, the New Waterway. *Amsterdam,* the largest city in Holland, stands on the shallow Zuider Zee, in a less favourable position for a modern port than Rotterdam. It is reached by two canals: the North Sea Canal cut across the base of the North Holland peninsula from *Ijmuiden,* and the North Holland Canal, which follows the length of the peninsula from Helder. The North Sea Canal has been considerably enlarged in order to enable larger vessels to reach Amsterdam. These improvements enable the canal to take larger vessels than the Suez Canal. Another canal joins Amsterdam to Rotterdam, and thus gives it water communication with the Rhine.

THE PEOPLE OF HOLLAND.

The majority of the inhabitants of Holland belong to the Northern Race. People who show characteristics of the Alpine Race are found in those parts of the country which were formerly most inaccessible, *i.e.* the islands and marshy districts at the mouth of the Rhine. Long ago their ancestors probably took refuge there. In Holland we have a very good example of the marked influence which environment has on the character of the people. The inhabitants of the Frisian and Zeeland Islands, and particularly those of the former, being by nature good fishermen, later became famous as seamen and founders of colonies, and took the largest share in the building up of Dutch sea-power. The Dutchman of the polders got his sturdiness, grimness, perseverance and obstinacy, in the long fight against the encroachments of the sea, and in the long and difficult task of reclamation. The East Hollander, who lives farthest from the sea, and comes in contact with it least, has felt its influence least.

The Era of Discovery, with its finding of new routes to the Far East, and its discovery of America, found the maritime countries of Western Europe excellently situated for participation in the race for commercial and colonial supremacy. We must not forget the important part taken by Holland. Her sailors went to all parts of the known world, and took no small part in the exploration of new countries. The Spanish ports were closed to them, but colonies were acquired in the West Indies, the East Indies, in South America, in South Africa, and in Ceylon, whilst Dutch sailors were the earliest explorers of the coast of West Australia, of Tasmania and of New Zealand. Even the present Dutch Empire, which is chiefly in the East Indies, has an area over sixty times as large as the homeland, whilst of the 57,000,000 subjects of the Queen of Holland, less than one-seventh live in Holland. Holland's great disadvantage is the shortage of minerals. It is partly this which has compelled her to take a lower position in the modern world than she had in the days before coal and iron became of such prime importance.

EXERCISES.

1. On a map of Holland shade the lands which are below sea-level, taking care to insert the coastal dunes correctly. Now mark the parts of the coasts and the banks of the rivers where the construction of dykes is necessary. If Holland were uplifted 25 feet indicate the new areas which would be added. Insert the New Waterway, the North Holland and the North Sea Canals. Mark the positions of Rotterdam, Amsterdam, the Hague, Utrecht, Flushing, Hook of Holland, and indicate the chief railway routes.

2. Draw an east and west section across Holland in the latitude of Amsterdam. Explain its leading features.

3. What broad comparisons and contrasts are there between Holland, Denmark and Belgium?

4. Why is it that trade statistics for Holland show a large import of raw materials for manufacture, and a large export of manufactured textile and iron goods?

5. Why is it that a small country like Holland has such important colonial possessions? Of what value are these possessions to the home country?

6. In what ways have the physical conditions of life in Holland stamped themselves on the character of the people?

7. "Schemes are in hand for the gradual electrification of the Dutch railways" (*Survey of Overseas Markets*: H.M. Stationery Office). Comment upon this statement.

8. If you have a *Times Atlas* examine the plans of Amsterdam and Rotterdam. What do they show you?

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